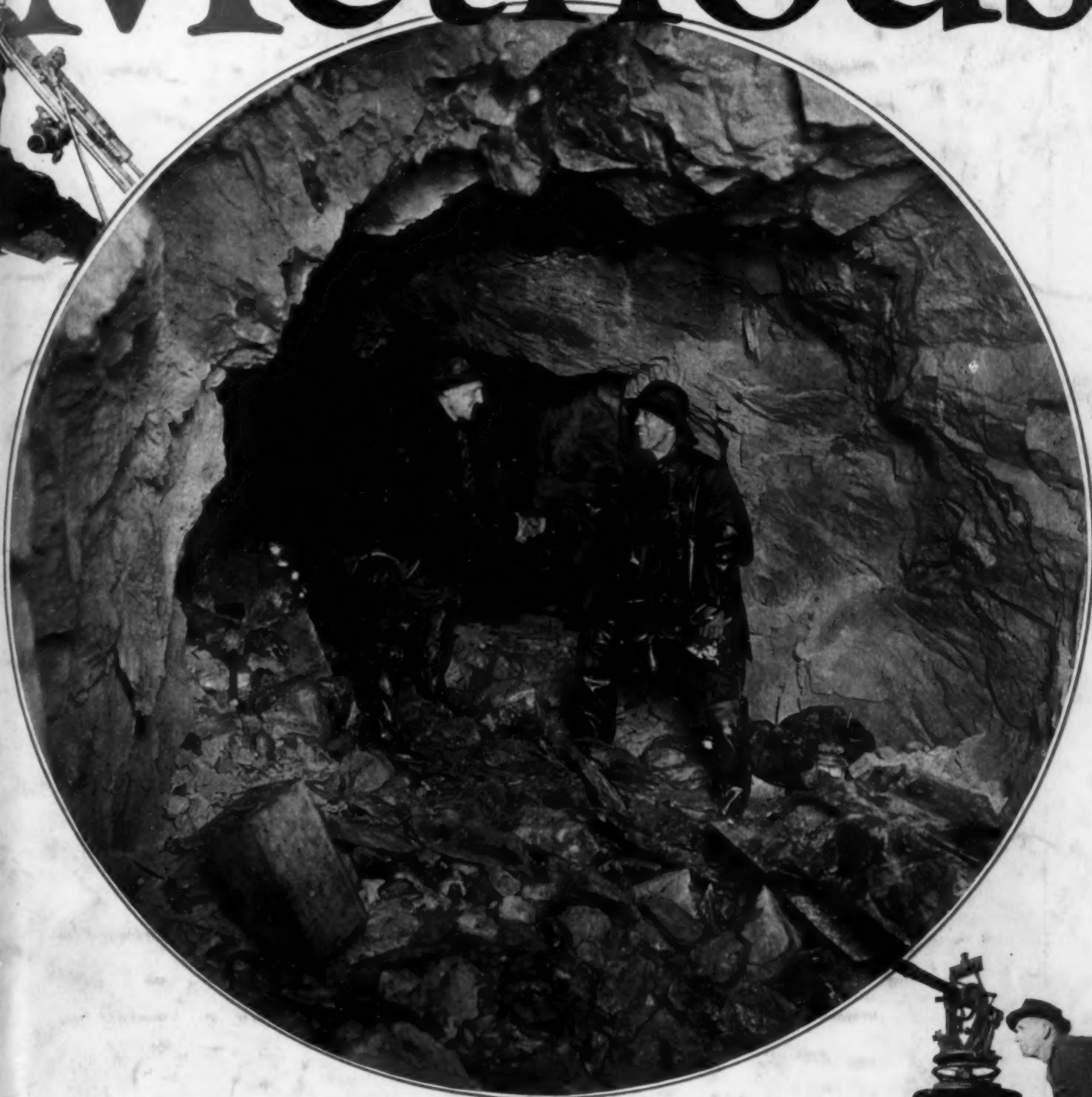


TECHNOLOGY DEPARTMENT

First Copy

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March
MAR 14 1929
1929
DETROIT

Construction Methods



When East meets West underground. Superintendents King and Kane of A. Guthrie & Company greet each other at the break-through of the pioneer bore for the Great Northern Railway's new Cascade Tunnel.



A MONTHLY PICTORIAL OF FIELD PRACTICE AND EQUIPMENT

General Construction • Highways • Buildings • Engineering • Industrial



“Black Base”

SUCCEEDS OTHER PAVEMENT TYPES IN BRECKENRIDGE, TEXAS

In 1927, officials of Breckenridge, Texas, decided to experiment with “Black Base” paving. In this type of construction, asphalt is employed in both the base course and wearing surface. So satisfactory was the experiment that all of the paving laid in this city during 1928 was of the “Black Base” type, in all of which TEXACO Asphalt was used.

Where the “Black Base” was constructed over old gravel, a 2½-in. asphalt foundation was laid. On residential streets which lacked gravel,

the asphalt foundation was 3½ in. thick, while on certain heavy traffic thoroughfares, an asphalt base 5 in. thick was laid. The thickness of the asphalt wearing surface varied from 1½ to 2 in., depending upon the amount of traffic anticipated.

Ability to withstand heavy traffic, imperviousness to water, perfect bond between base and top course, speed of construction are a few of the important advantages of “Black Base” pavements constructed with TEXACO Asphalt.

TEXACO ASPHALT

New York
Philadelphia
Buffalo
Richmond
Boston



THE TEXAS COMPANY
ASPHALT SALES DEPT.
17 Battery Place, New York City



Jacksonville
Chicago
Cleveland
Kansas City
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Dallas



Tighter Credit Policies

THE recent declaration of credit policies for the sale of construction equipment, announced by a group of 46 leading manufacturers to the Associated General Contractors of America, marks a long stride toward the goal of stabilizing the construction industry and eliminating irresponsible competition by shoestring bidders. The too frequent practice, in the past, of extending almost unlimited credit to any one masquerading under the title of "contractor" has exerted a demoralizing influence. The new and tighter credit policies recently endorsed will do much to correct past abuses.

Briefly, the new credit terms cover

Changing Jobs?

With the spring season for construction close at hand, a good many field men will soon be moving to new job locations. Make sure that your copy of *Construction Methods* follows you by informing us of your new mailing address.

three general classes of equipment, with recommendations for a fourth (industrial railway equipment) to be made later.

Group 1 includes concrete mixers and pavers. When sold on deferred payments an initial cash payment of at least 25 per cent is specified, the balance being covered by interest-bearing notes due in 60, 90, 120 days, five months, and six months. For full payment within 10 days, a cash discount of 4 per cent is allowed.

Group 2 includes heavy equipment, such as shovels, cranes, tractors, crushers, trenchers, etc. For this group, the initial cash payment must be 25 per cent, with the balance covered by 12 interest-bearing notes, one maturing every 30 days from date of shipment. For payment in full within 10 days, a cash discount of 4 per cent is allowed. Under certain special conditions, deferred payments in this group may be extended to 15 months,

CONSTRUCTION METHODS

A monthly review of modern construction practice and equipment

PUBLISHED BY
MCGRAW-HILL PUBLISHING COMPANY, INC.
TEN TH AVENUE AT 36TH ST., NEW YORK

in which case provision is made for increasing the deferred payments three-quarters of 1 per cent

Group 3 includes bins, truck bodies, buckets, conveyors and loaders, graders, derricks, hoists, compressors, pumps, etc. Here the cash payment required is 33½ per cent of the total, with the balance to be paid by four interest-bearing notes, one maturing every 30 days. The cash discount for this group is 3 per cent if full payment is made within 10 days.

Adherence to these credit policies will put construction on a sounder business basis. Here is an excellent example of the constructive work that can be done by co-operation between the makers and the users of equipment.

670

On Curing Concrete

To the major operations of concrete highway construction—grading, form-setting, mixing, placing and finishing concrete—engineers and contractors have devoted intensive study and field investigation, with the result that they have evolved methods and equipment that can be depended upon to produce satisfactory results. The final operation of the job—the curing of the

finished slab—is exceedingly important, even though it involves only a small percentage of the outlay in labor and equipment required for the other job operations previously noted.

Curing has been done in several different ways—by ponding, sprinkling, covering with moist earth, hay or canvas, by the application of such chemicals as calcium chloride or silicate of soda and, a development of very recent origin, a thin coating of bituminous material sprayed on the surface. Opinion is divided as to the merits of the several methods of curing concrete pavement. It is good news, therefore, to learn that the Highway Research Board of the National Research Council has formed a special committee to investigate this problem. The outcome of its studies, which will be directed by Fred Burggraf, loaned to the Research Board by the Illinois State Highway Department, will be a valuable contribution to road builders in rounding out their technique.

670

Mixing Time

A recent survey of the specifications governing the mixing of concrete for highway pavement indicates that 33 states require a 1-min. mix, 6 states a 1½-min. mix, and 9 states a 1¼-min. mix. The evidence is strong, according to the U. S. Bureau of Public Roads, that thoroughly satisfactory concrete can be produced by 21E and 27E pavers in a 1-min. mixing period.

Tunnel Comparisons

A comparison of the Cascade tunnel, described on pp. 34-38 of this issue, with other railroad tunnels in Europe and North America, as given in the accompanying table, throws light on the speed which A. Guthrie & Company made in driving this newest bore for the Great Northern Railway.

Name of tunnel	Length in ft.	Method of driving	Average penetration in ft. per day—all faces	Cost per ft.
Simplon (No. 1).....	65,734	Pioneer and bottom heading	24.0	\$243
St. Gothard.....	48,983	Top heading.....	14.5	231
Loetschberg.....	47,085	Bottom heading.....	19.6	211
Mt. Cenis.....	42,150	Bottom heading.....	8.2	345
New Cascade.....	41,152	Pioneer, shaft, center, top and bottom headings.....	37.0	328
Moffatt.....	32,253	Pioneer and center heading..	20.0	480

The costs include the lining. All four Alpine tunnels (first in the list) are lined with stone; the Moffatt, with timber.

To Help Men Earn More

BUSINESS will prosper and men will earn more only through improved methods and management rather than by arbitrary wage-increases that are not based upon greater individual productivity. On this basic truth a recent economic review comments as follows:

"The jacking up of wages and prices by arbitrary means is a continuous process, one move counterbalancing another, yielding no general benefits, significant of no real progress, but costing all classes heavily through the friction, antagonisms and losses that are incidental to industrial strife.

"The gains by which a given tonnage of freight can be transported with a lower consumption of coal, by which coal is fed into a locomotive firebox automatically and without the hard manual labor formerly required, by which a carload of coal is lifted into the air by machinery and dumped

without manual effort, by which much of the laborious and dangerous work of coal-mining is now done by machinery, by which construction work is facilitated by powerful equipment and improved materials—these gains, which represent the increasing command of man over the resources of nature—are the only ones that hold out the hope of a rising standard of living despite an increasing population."

To help achieve such gains is the mission of *Construction Methods*. Its reading and advertising pages are devoted to those methods through which "construction work is facilitated by powerful equipment and improved materials."

This job, well done, is bound to be a substantial contribution to the progress and prosperity of a great industry and of every individual worker within its ranks.

Willard Chevalier
Publishing Director

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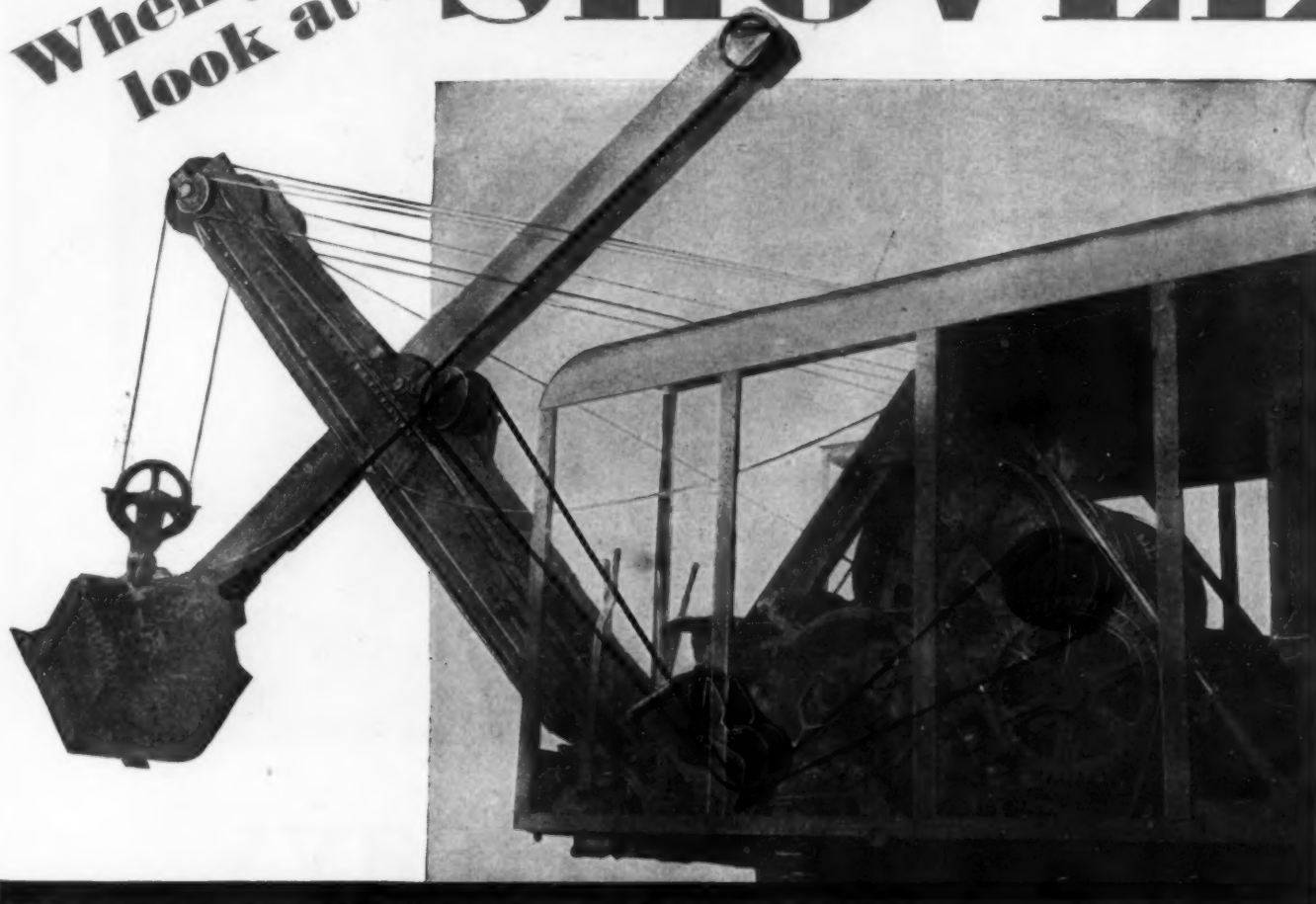
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When you
look at a

SHOVEL



LOOK AT
THE

CROWD

THE crowd is the important thing, because dirt movers' dollars depend on full dippers, fast dumping and number of trips per minute.

Byers independent cable crowd is the greatest feature in gas shovel design today—there's nothing else like it.

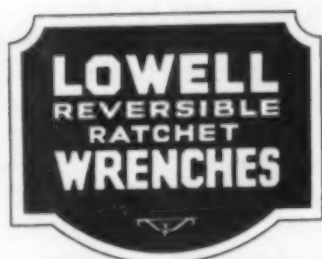
Power is ample; drive is direct from motor to drums through only one shaft; thus the additional horse power allows extra fast cable speeds. These factors, plus a crowd design that is known for its ability to bring the dipper up heaping, dump it fast and spot it again quick, makes Byers shovel your best bet on a yardage per dollar basis.

Write today for the facts about Byers Shovels. New Catalogs on "Master" and "Bulldog" models are waiting for your request.

THE BYERS MACHINE COMPANY, Ravenna, Ohio
Sales and Service Throughout the Country

**It's the Byers
CROWD
that does it**

BYERS



For Heavy Work—

When it comes to tightening up big nuts it's a case of where brute meets brute if a Lowell Steel Socket Bridge Wrench once gets a grip.

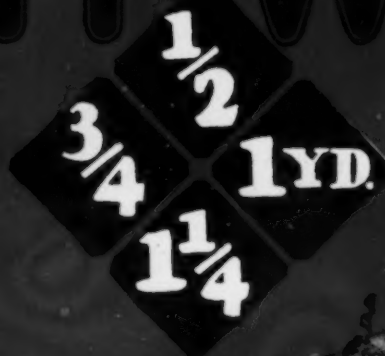
All those huskies in the picture have to do is *pump*. Note that leverage with backs to the job. Imagine the time lost turning around to refit an ordinary open end wrench. There's no argument, man, when you compare the quick, certain operation of the Lowell reversible ratchet feature. And nuts don't argue either when they're up against a Lowell.

*Write for Catalog R illustrating the complete line.
Big special wrenches for special needs.*

LOWELL WRENCH COMPANY
Worcester, Mass.

A new and better

NORTHWEST



CM3-Gray

NORTHWEST ENGINEERING CO.

The world's largest exclusive builders of gasoline and electric powered shovels, cranes and draglines.

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Gentlemen:—

Please send me full information on The New and Better Northwest.

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Address

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ask!

SPEED — essential element in repaving this important thoroughfare



4:45 p. m., September 10, 1928.
Placing concrete made with Lehigh
Portland Cement. Photo shows con-
crete crew finishing up day's work.



11 a. m., September 11, 1928. 18
hours after concrete was placed a truck
and load weighing 14 tons is driven on
the concrete without damaging it.



4:45 P.M.

GEORGE H. HARDNER, well-known Allen-
town contractor, recently laid a concrete
pavement on an important thoroughfare of
that city.

18 hours after placing a section of the concrete,
a 14-ton load was driven over it. No injury re-
sulted. The compressive strength at this time
averaged 1150 pounds per square inch.

48 hours after placing concrete, the road was
thrown open to traffic. Compressive strength at
this time averaged 2260 pounds per square inch.

The materials used were a careful 1:2:3 mix of
concrete, using every-day, run-of-mill Lehigh
Portland Cement.

Full technical details of this unusual devel-
opment, accompanied by complete supporting
data, are contained in our new free bulletin
"High-Early-Strength Concrete with Lehigh
Cement." Please write for it or send the coupon.

Lehigh Portland Cement Company

Allentown, Pennsylvania

Chicago, Illinois

Branch offices in principal cities



FREE — Interesting new bulletin
"High-Early-Strength Concrete
with Lehigh Cement." Send coupon
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11 A.M.

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Lehigh Portland Cement Co., Box 9-C, Allentown, Pa.

Please send bulletin described above.

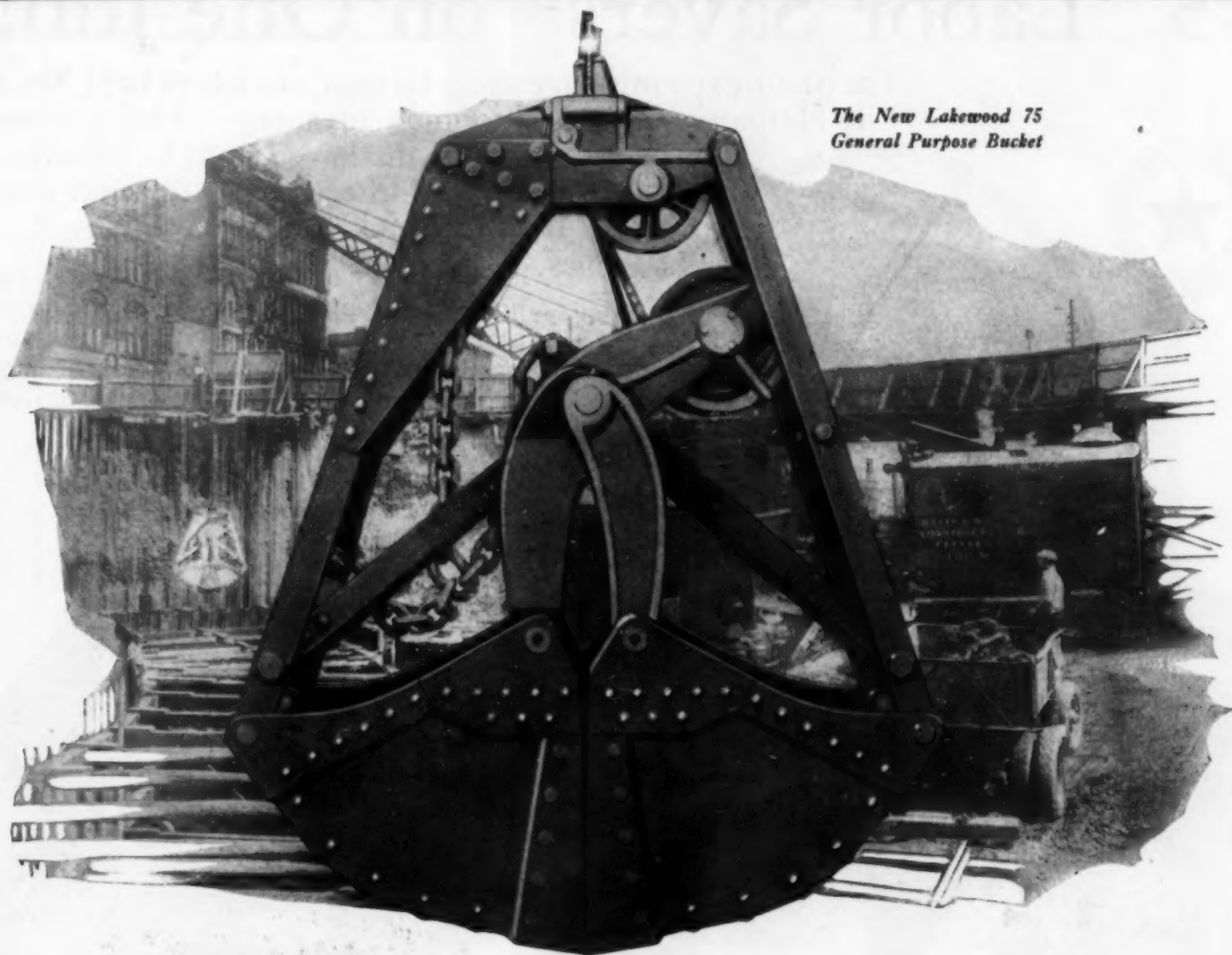
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LAKEWOOD CONSTRUCTION EQUIPMENT



*The New Lakewood 75
General Purpose Bucket*

The **OLD STANDARDS are GONE!**

THERE'S something new—something different in clam shells—more work done—yet no more weight—no more cable overhauled—no change in working height.

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Let us send you complete data on the new measuring stick for clam shell performance.

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The Lakewood Engineering Co., CLEVELAND • O.

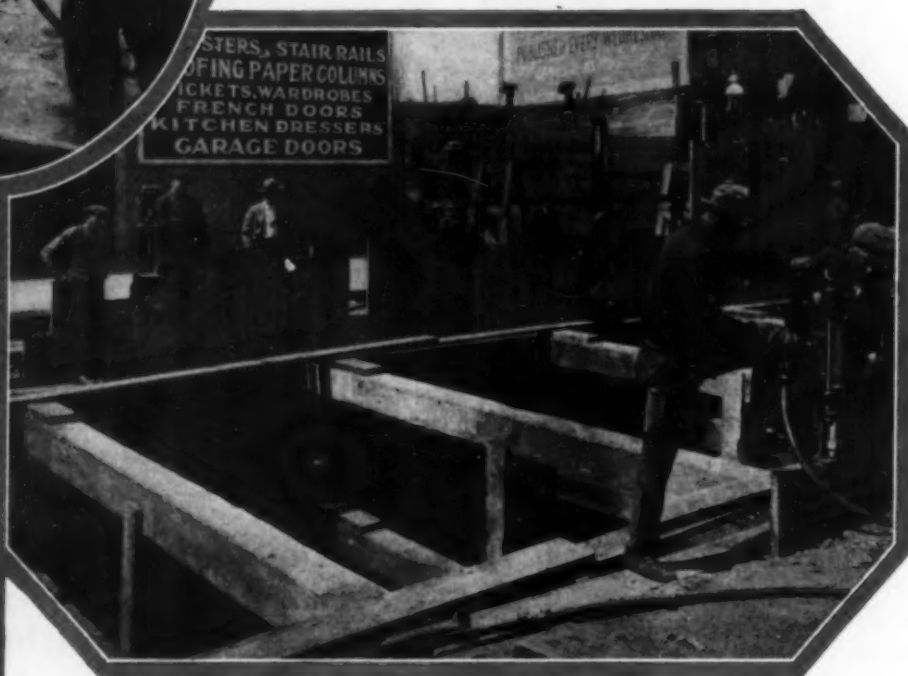
15 "Labor Savers" on One Job!

The pictures on this page show various jobs where little No. 1 Pile Hammers were used to good advantage. The hammer shown in the lower right hand corner was one of fifteen used on a sewer contract in Brooklyn, N. Y.

A large number of these "labor savers" are being used throughout the world, each one displacing several men with mauls and doing the same work quicker and cheaper. They are Nos. 1, 2 and 3 of the complete McKiernan-Terry line.

Operated by Steam or with Portable Air Compressors

Write for Catalog.



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Pile Hammers and Accessories, Drilling Machinery

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The Pioneer Double-Acting Hammers

PULL

at
135° above

and at

**30° below
zero**



the Gas+Air BUCYRUS-ERIE

“has done remarkable work” for Thomas Rising, “with no mechanical delays whatever”

First he worked a Gas+Air in the Great Lakes country—ripping out rock at the stinging temperature of 30° below zero.

This was at Caneadea Dam, for the Flower City Excavating Co. of Rochester, N. Y., who wrote: “Our Gas+Air BUCYRUS-ERIE has just taken out 25,000 yds. of rock and 10,000 yds. of earth, supplying air for rock drilling—has done remarkable work on this tough job.”

And now Tom Rising is on another Gas+Air—this time in Colombia, where the tropic sun beats a steady tattoo of blistering heat on men and machines. And he writes:

“The Gas+Air BUCYRUS-ERIE works fine here

in the equatorial heat, which often gets up to 135°. No mechanical delays whatever in 4 months—our only parts have been 6 sets of dipper teeth and a fan belt.”

You can place real confidence in the shovel that shows such Reliability under these extremes of weather conditions—while doing the hardest digging a shovel can be put to.

And this reliable digger gives a much larger output—having direct-connected air engines for crowding and swinging, it is far ahead of other gas shovels for Big Production.

*Easily convertible to a highly efficient
clamshell or dragline excavator*

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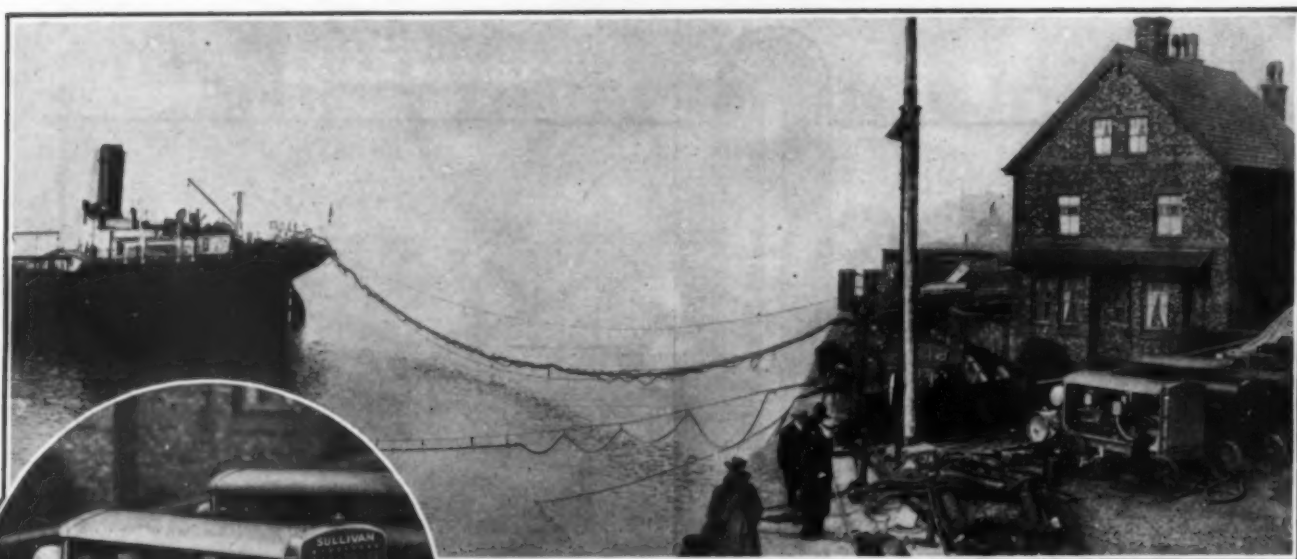


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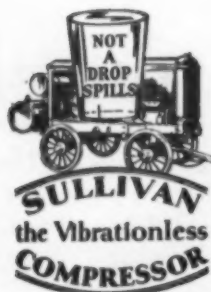
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Vibrationless Compressors

Avert a Harbor Fire



C. Sullivan Mach'ry Co.

*This Vibration Test
tells your compressor's
future.*

You can make sure of dependable service in a compressor before you buy it—by measuring vibration, the greatest trouble factor. Place a glass of water filled to the brim on the compressor frame. Run the machine at full speed and watch the glass. Under this test, Vibrationless Sullivans hardly ripple the water.

The oil tanker *Seminole* ran aground at Liverpool! Twenty-five tons of oil lay over the harbor. Eight thousand tons more had to be removed, to refloat the *Seminole*.

But electric or steam pumps could not be taken aboard. A spark falling on the deck or into the water would start a fire—periling other ships and miles of docks.

So the contractors decided on compressed air. They would pump the oil out of the *Seminole* and into another tanker, through a 12-in. pipe line. They hauled their Vibrationless Compressor to the dock, bought another Sullivan, and borrowed several miscellaneous compressors.

These were connected in battery on the shore, away from the oil—and compressed air was jammed through the hose into the *Seminole*. In three days the tanker was refloated.

Every day, new uses are found for compressed air. For even where hand labor might be used—and where it is cheap—it can no longer compete with the dependable air power of *Vibrationless Compressors*.

Send for Catalog 7283-F

**SULLIVAN
MACHINERY
COMPANY**

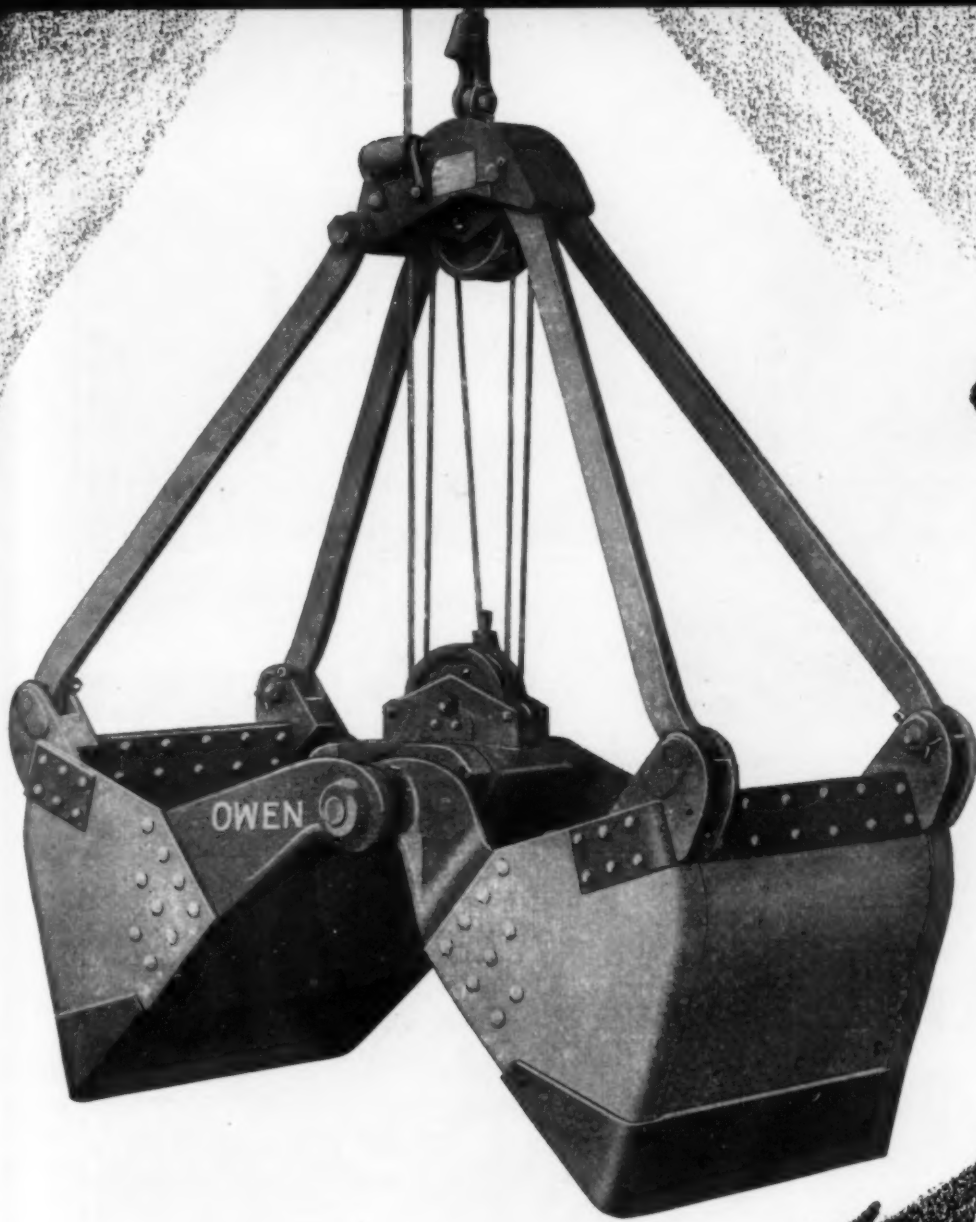
168 S. Michigan Ave.
Chicago

30 Church St., New York



*What happened at Buffalo when the oil barge "Cornwall" caught fire—the tanker *McCall* in flames.*

SULLIVAN



"A Mouthful at Every Bite"
—and one right after another! *Speed* is the distinctive feature of the Owen Type "K" Bucket shown here—swift closing...fast, clean dumping...quick returns. It is a bucket especially suited for rapid rehandling.

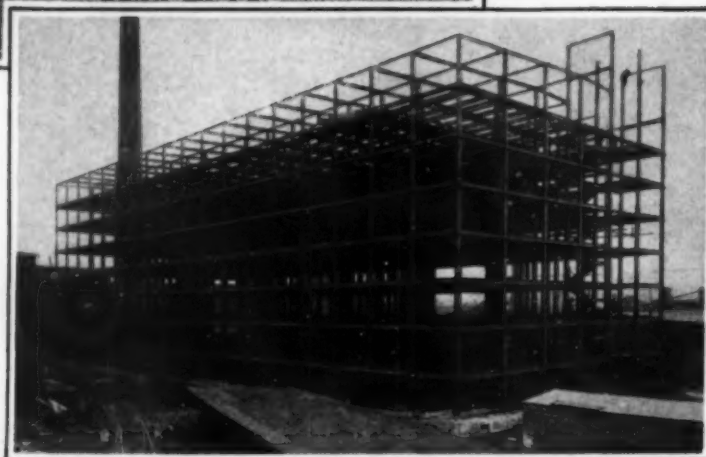
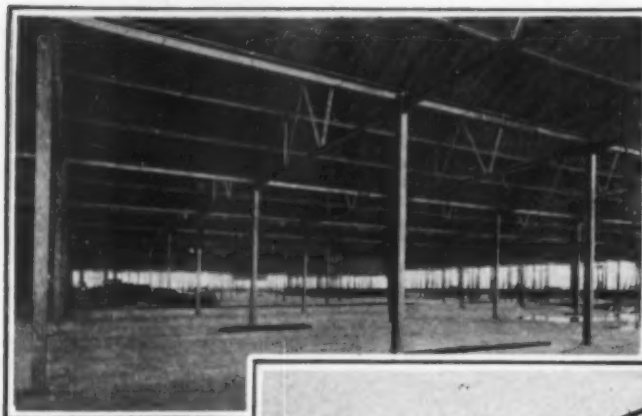
When you put the Type "K" Hi-Speed to work, it doesn't take long, with its "more bites per day," to demonstrate what the Owen Guarantee really means—a bigger day's work than with any other bucket of the same weight and capacity.

Send for the Type "K" Folder, or for a catalog which describes the entire line of Owen Buckets.

THE OWEN BUCKET COMPANY
6023 BREAKWATER AVENUE • CLEVELAND, OHIO



Owen Buckets



CARNEGIE BEAMS

for
Industrial Buildings

Carnegie Beam Sections are particularly adaptable to the construction of industrial buildings. Pictured above are several types of the many industrial buildings throughout the country in which these beams have been used with great economy and satisfaction.

Carnegie Beams offer a series of sections designed to give a maximum least-radius-of-gyration combined with minimum weight for long, unbraced column lengths. For eccentric column loadings from cranes, lean-tos, machinery, hoists or platforms, there are sections having large radii of gyration on the major axis with a minimum of metal. For long, heavily loaded spans or limited headroom, a complete range of beams of high section modulus is offered

which reduce obstructive columns to a minimum.

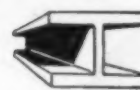
A unique feature of Carnegie Beams is their parallel flanges. Eight surfaces for connections are thus provided instead of four, simplifying very markedly the great variety of connections usually required in industrial buildings, such as special columns for cranes, crane girders, rail clamps, mono-rail tracks, brackets of all descriptions, pipe and conduit hangers, sash, partitions, machine bases and many others.

If you are considering the erection of any type of industrial building, it will pay you to investigate the advantages and economies of Carnegie Beams. Write for handbook—"Carnegie Beam Sections."

CARNEGIE STEEL COMPANY



Subsidiary of UNITED STATES STEEL CORPORATION
CARNEGIE BUILDING ... PITTSBURGH, PA.



The Gas-Electric is Gaining in Popularity

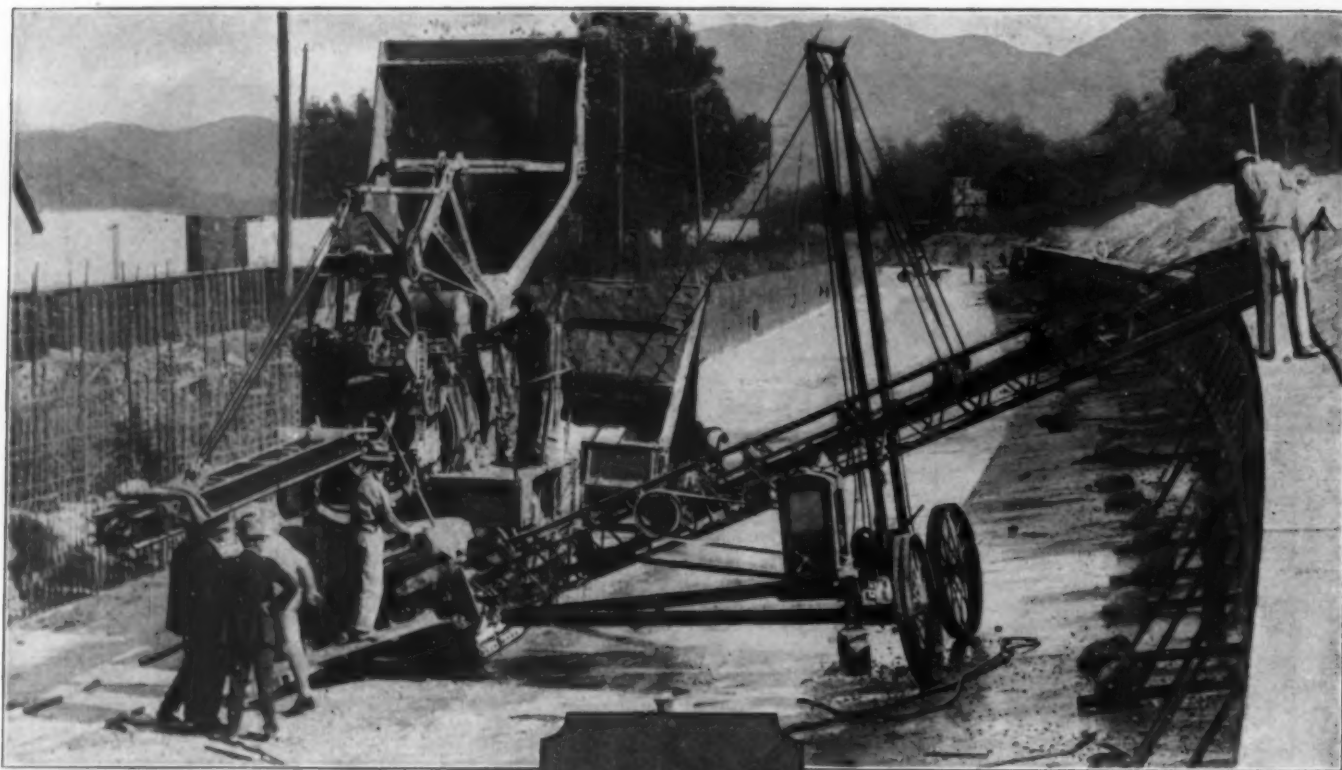
On the Gas-Electric you get independent drives on the hoist, swing and crowd

THE flexible operation of the steam shovel is obtained in the Gas-Electric by the use of separate and independent drives for the hoist, swing and crowd. The motors are direct geared to these motions and deliver their power in the same manner as the engines of the steam shovel—giving high speed under light load, low speed under heavy load and stall with maximum pull under extreme load.

THE MARION STEAM SHOVEL COMPANY
MARION, OHIO, U. S. A.



MARION



From Mixer to Forms

One Barber-Greene Belt Conveyor can eliminate a terrific expense in chutes, hoists, elevators, towers, pushers, and shovels on many concrete construction jobs.

The Barber-Greene above conveyed an average of 45 tons of wet concrete per hour between the mixer and the forms—enough to keep 6 and 8 tamers busy.

Other contractors are using B-G Belt Conveyors for carrying wet and dry mixes up inclines of

From Car to Storage

**WET
or
DRY**

No Chutes—No Towers

better than 27°—fast enough to keep the largest mixers operating at top speed.

And when not conveying wet concrete, the same Barber-Greene can be used for unloading aggregates—or handling other bulk or bagged materials.

Write for a copy of "Wet or Dry" showing how many contractors are driving costs unbelievably low on jobs like your own.

From Storage to Mixer



BARBER GREENE
BARBER-GREENE COMPANY 530 W. Park Avenue, Aurora, Illinois

"HERCULES" RED-STRAND WIRE ROPE

REG. U.S. PAT. OFF.

A Time and Money Saver—and Why

The longer a wire rope lasts the less time and money are lost in making wire rope changes.

"HERCULES" (Red-Strand) Wire Rope is exceptionally long lasting because it is made of acid open-hearth steel wire, and because we rigidly test every wire that goes into it to make sure that it meets our exacting requirements. Any wire lacking—if only in a minor detail—is promptly rejected.

We make "HERCULES" (Red-Strand) Wire Rope in both Round Strand and Patent Flattened Strand construction in order to meet all working conditions. If you will tell us how you use wire rope we shall be glad to help you select the right construction for your work.

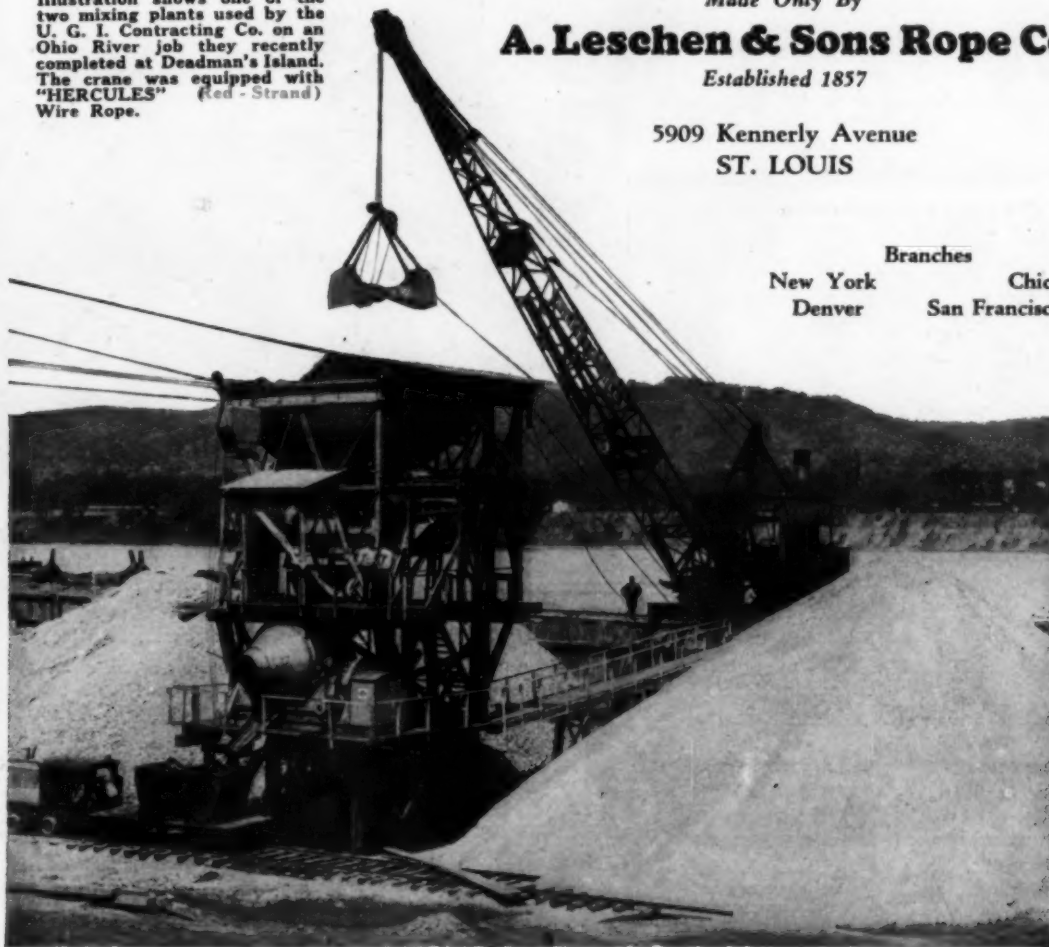
Illustration shows one of the two mixing plants used by the U. G. I. Contracting Co. on an Ohio River job they recently completed at Deadman's Island. The crane was equipped with "HERCULES" (Red-Strand) Wire Rope.

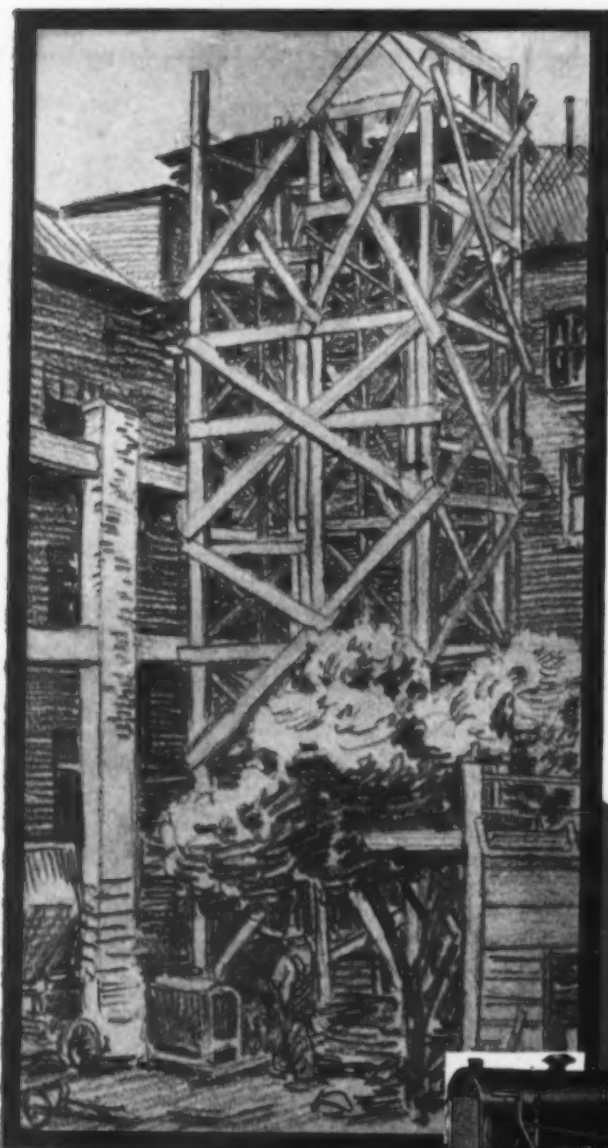
Made Only By
A. Leschen & Sons Rope Co.

Established 1857

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Branches
New York Chicago
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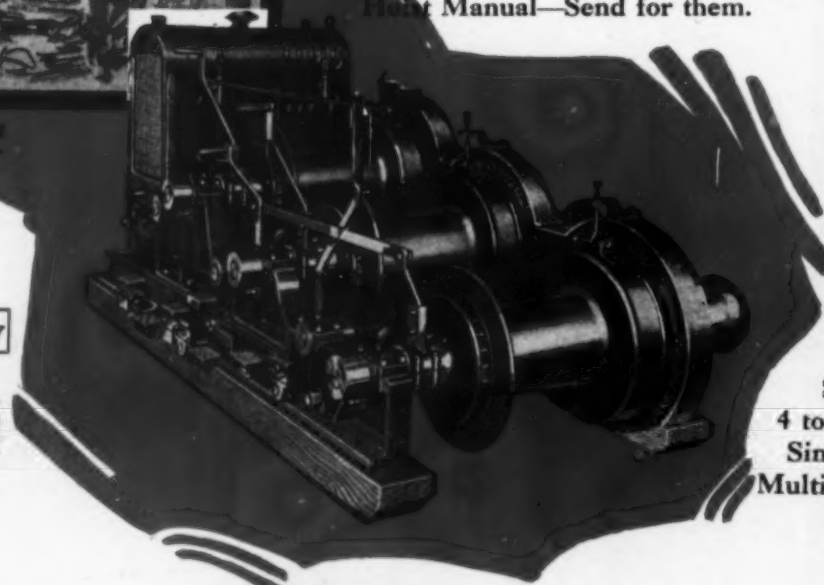


Drawing from photograph of
2 drum, 15 hp. installation



The Hoist With The
EXCLUSIVE BRONZE SCREW
PAT. APR. 20, 1910

Another exclusive feature of
design eliminates pressure
against side frames, avoiding
spreading and possible break-
age.



Sizes
4 to 50 H.P.
Single and
Multiple Drum

Where A Good Hoist Is Half The Battle

Material handling is a big part of any construction job. A good hoist, rigged to an elevator, as shown, keeps material flowing, and the whole job moving like you want it to move.

BROWN "GIANT LINE" HOISTS are good hoists. They are the fruit of 24 years' experience plus the most advanced engineering.

Powerful, reliable—you can work them to the limit year after year. Built of very best materials by most modern methods.

Gasoline power—work anywhere—single or multiple drum—reversible, non-reversible and conveyor types. Boom Swingers for derrick work. Electric power if wanted. Capacities 4 to 50 H.P.

Our Engineering Department will gladly help you on your hoist problems—no obligation.

Ready for you—Catalogue L and valuable Hoist Manual—Send for them.

The Brown Clutch Co.

Sandusky, Ohio, U. S. A.

**SINGLE & MULTIPLE
DRUM - REVERSIBLE**

**BROWN
GIANT-LINE
HOISTS**

**NON-REVERSIBLE AND
CONVEYOR TYPES**

HOIST SPECIALISTS FOR 24 YEARS

DEPENDABLE. .. POWER AT LOWEST OPERATING COSTS



WHEREVER the Le Roi Engine is in service you find "life" every minute. It has that facility of keeping everlastingly at it—of giving *dependable power* . . . Contractors, the country over, tell us how the Le Roi Engine rolls up months of unbroken service—how it rarely takes *time-out* for itself . . . Besides, Le Roi's operating costs are lowest per day and per year. Know the Le Roi as others do!

LE ROI COMPANY
MILWAUKEE, WIS.

LE ROI ENGINES

3 to 170 HORSE POWER



*Bates bags
save material . . . time
. . . labor . . . and money*



This
Trade-Mark* . . .

for your protection and profit

FROM now on this trade-mark will be on every Multi-Wall Paper Bag made by the Bates Valve Bag Corporation.

It identifies the product of the *originators and largest makers* of Multi-Wall Paper Bags, which effect such important savings in the handling and storing of cement, plaster, gypsum and similar products.

Bates Multi-Wall Paper Bags are moisture-proof. They reduce losses of materials through bag breakage and sifting. They empty out clean . . . save space in storage . . . are cleaner and more convenient to handle and store . . . and eliminate all the petty annoyances and details connected with bag salvage and returns.

* Indicates product MADE ONLY by the Originators and Largest Makers of Multi-Wall Paper Bags

BATES VALVE BAG CORPORATION · 35 EAST WACKER DRIVE, CHICAGO, ILL.

Price and Value

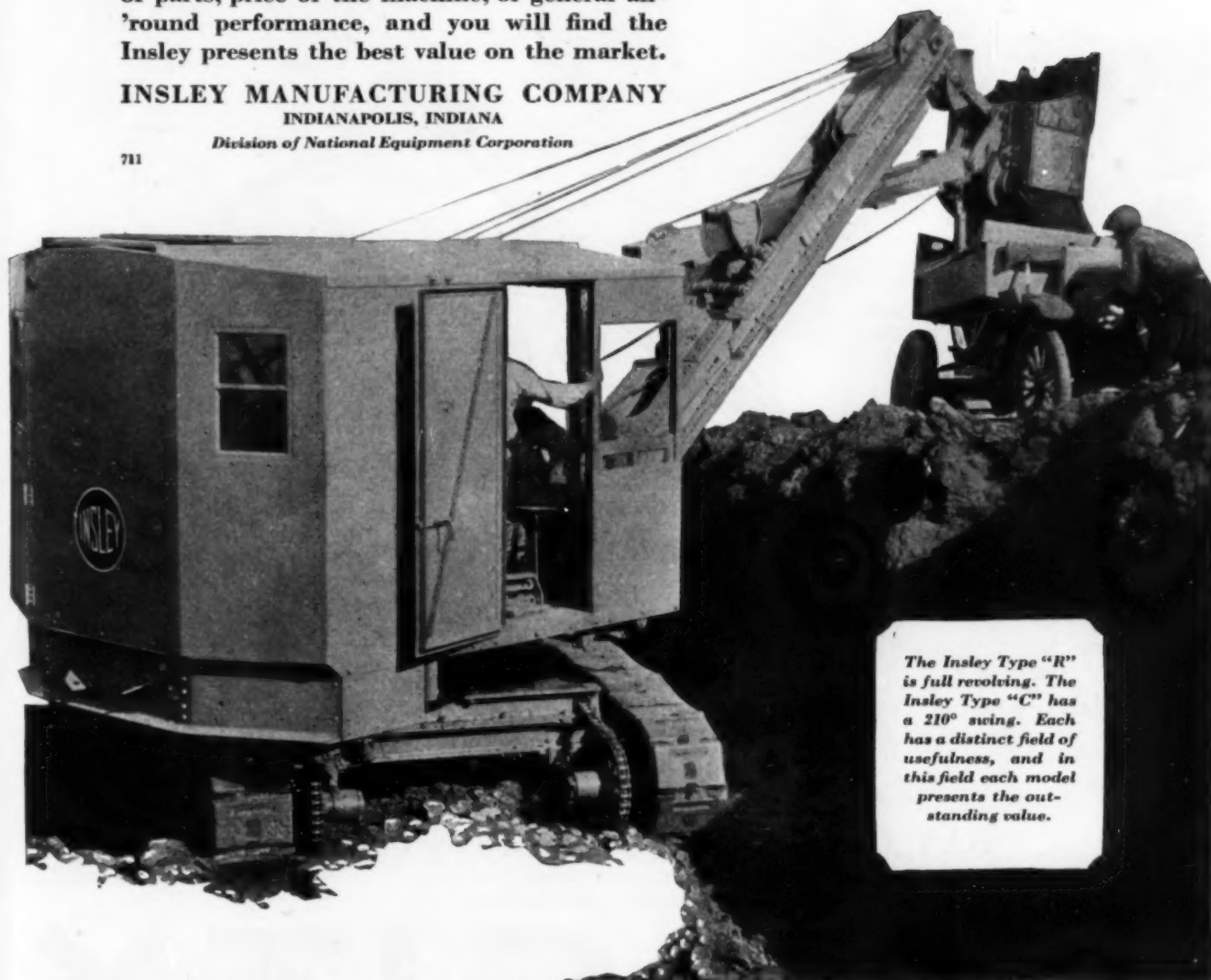
THE price of the Half-Yard Insley is only half the story. For that price you get the most modern in shovel construction, the very finest in material and workmanship, and performance in yards of dirt per day that gives you an entirely new conception of the possibilities of a half-yard shovel. And you can well afford to pay the price of a Half-Yard Insley.

Compare it to other machines in the half-yard field on a basis of efficient design, material, size of parts, price of the machine, or general all-round performance, and you will find the Insley presents the best value on the market.

INSLEY MANUFACTURING COMPANY
INDIANAPOLIS, INDIANA

Division of National Equipment Corporation

711



The Insley Type "R" is full revolving. The Insley Type "C" has a 210° swing. Each has a distinct field of usefulness, and in this field each model presents the outstanding value.

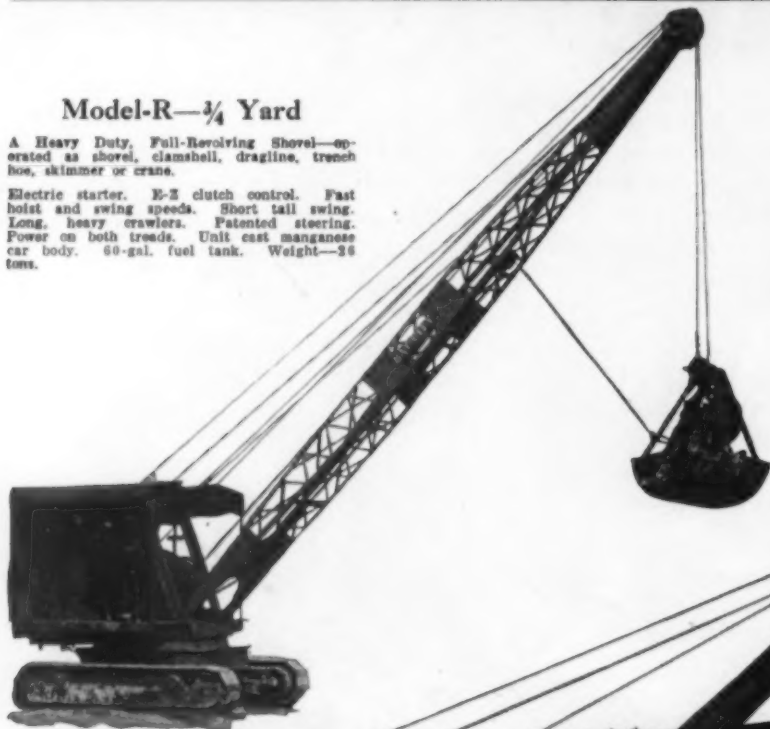
INSLEY

A FAMILY of FAST WORKERS

Model-R— $\frac{3}{4}$ Yard

A Heavy Duty, Full-Revolving Shovel—operated as shovel, clamshell, dragline, trench hoe, skimmer or crane.

Electric starter. E-Z clutch control. Fast hoist and swing speeds. Short tail swing. Long, heavy crawlers. Patented steering. Power on both treads. Unit cast manganese car body. 60-gal. fuel tank. Weight—26 tons.



Model-K—Light $\frac{1}{2}$ Yard

Convertible Shovel, Crane, Skimmer, Dragline or Trencher. Swinging speed—5 to 6 R.P.M. Travels—1 $\frac{1}{4}$ miles per hour. Height—10 ft. Weight—13 tons. Unit cast car-body. No square clutches. Full-revolving.

MOST contractors need one—or the entire family.

All of these machines are full crawler mounted and one man operated.

All are convertible.

All are amply and dependably powered.

Model-K and Model-R are full-revolving. The Tractor Shovel has $\frac{3}{4}$ swing.

Highest type construction throughout. Ball or roller bearings on all shafts.

These Bay City machines are the kind that one contractor recommends to another.

Write today for complete specifications and catalog of the type of machine which interests you.



Tractor Shovel

The leader in the small shovel field. Operates shovel, clamshell, dragline or trench hoe. $\frac{3}{4}$ -yd. bucket. $\frac{3}{4}$ swing. McCormick-Deering Power Unit. Timken and Hyatt bearings. Full crawlers. One man operation. Weight—10 tons. Highly praised and recommended by users everywhere.

BAY CITY SHOVELS, INC., Bay City, Mich.

Formerly—Bay City Dredge Works
New York Office—302 Broadway

BAY-CITY

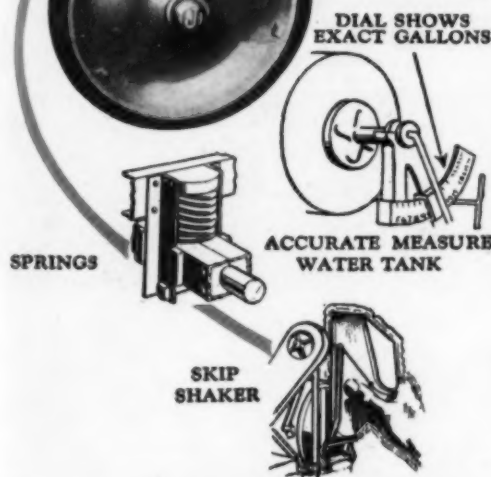
FULL OR PART CIRCLE—SHOVELS—CRANES—EXCAVATORS

Fast, Portable Two Bag Mixer - for Heavy Duty!

All-Steel and 100% Ball Bearing - Short Coupled Direct Driven - Runs Like a Clock!

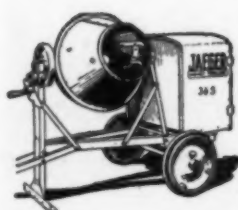


10S Size
holds
2 Bags



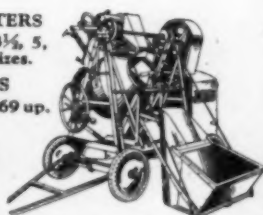
HERE'S a mixer investment that gets you the practical savings of a 2-bag mix along with the easy handling of a one-bag size. No counter shaft or heavy castings to waste space and power. The all-steel construction saves $\frac{1}{2}$ ton weight, gives 50% greater strength. Machined steel tracks, chilled ground faced rollers and 100% ball bearings eliminate breakdowns and build up power savings.

Extra large drum openings, fast Automatic Skip Shaker, Accurate Measure Water Tank, Dual Tire Wheels, Springs, One Man Control. Write for catalog and prices.



JAEGER TILTERS
with loaders, 3 $\frac{1}{2}$, 5,
7, 10, 14 ft. sizes.
TRAILERS
priced from \$169 up.

NON-TILTS
7 to 28 ft.



Mail this Coupon for Catalog and Prices.

THE JAEGER MACHINE CO. Date _____
800 Dublin Avenue, Columbus, Ohio

Please send catalog, prices and terms on

☐ NON-TILT MIXERS

☐ TILTING MIXERS

☐ PLASTER MIXERS

Name _____

Address _____

MIXERS

PAVERS

PNEUMATICS

Ransome

CENTRAL MIXING PLANTS

More Ransome Mixers are found in Central Mixing Plants than any other make.

The following Central Mixing Plant concerns have selected Ransome Mixers:

P. Flanagan & Son, Baltimore, Md.
One—1 yd. mixer.
Chas. H. Fry Construction Company, Erie, Pa.
One—1 yd. mixer.
Ready Mixed Concrete Co. Pittsburgh, Pa.
Two—3 yd. mixers.
General Material Company, St. Louis, Mo.
Three—2 yd. mixers.
Hankins-Paulson Company, Uniontown, Pa.
One—1 yd. mixer.
Ready Mixed Concrete Co., Kansas City, Mo.
Three—2 yd. mixers.
McClain Sand Co., Morgantown, W. Va.
One—1 yd. mixer.
Charles Warner Co., Philadelphia, Pa.
Two—1½ yd. mixers.
Ready Mixed Concrete Corp., New York City
One—3 yd. mixer and one 1½ yd. mixer.
The Van Sciver Corp., Philadelphia, Pa.
Two—2 yd. mixers.
Ready Mixed Concrete Corp., Richmond, Va.
One—2 yd. mixer.
Super Concrete Corp., Washington, D. C.
One—3 yd. mixer.
Jahncke Service, Inc., New Orleans, La.
One—1 yd. mixer.
Caldwell Construction Co., Charlotte, N. C.
One—1 yd. mixer.
John P. Callaghan, Inc., Newark, N. J.
One—1½ yd. mixer.
Big Rock Stone & Material Co., Little Rock, Ark.
One—2 yd. mixer.
Avril Tru-Batch Concrete, Inc., Cincinnati, Ohio.
One—2 yd. mixer.
Wet Mixed Concrete Co., St. Louis, Mo.
Two—2 yd. mixers.

If you haven't read "A Survey of Central Mixing Plants" send us \$1.50 before the limited edition is exhausted.



Central Mixing Plant owned by J. P. Callaghan, Inc., Newark, New Jersey, containing a Ransome 1½ yd. mixer.

STEEL TOWERS

CHUTES

MIXERS

TILTING MIXERS

PAVERS

Ransome Concrete Machinery Company
1850—Service for 75 Years—1925
Dunellen New Jersey



DRIVE

WITH UNION

THAT'S the thing to do, if you want to speed up all pile driving work and, at the same time, do it at the lowest possible cost.

Take this grade crossing elimination job on the main line of the C.R.R. of N. J. This contractor knows it pays to drive with Union Hammers.

He reported that this was one of the hardest steel sheet driving jobs he had ever encountered. But his Union Size No. 2 Hammer walked away with it.

Note the method of handling the hammer on a gin pole.

Union Hammers are made in 10 sizes to drive and pull the heaviest piles or lightest sheeting. Bases to drive any kind of piling without damage to heads.

Catalog 124 explains why Union Hammers do less damage to your bank account!

UNION IRON WORKS, INC.
Newark and Grove Sts.,
Hoboken, N. J.

UNION
DOUBLE-ACTING
PILE HAMMERS

CAMDEN

New Jersey is really as much a Keystone state as is Pennsylvania, in the sense that its contractors use many hundreds of Keystone Excavators.

You will find them on nearly all the street paving and ditching contracts from Jersey City to Camden.

Fabio Matarazzo, of Camden, is the contractor on the interesting Skimmer job depicted below. The bucket is 5/8-yard; but in formations like this many contractors use the 9/10-yard Skimmer.

The illustration below shows the ideal Keystone method of excavating to a fine

grade. The Skimmer is taking off about 18 inches of old road surface and is leaving the grade finished so that little or no hand trimming will be necessary.

The trucks form in line at the left of the machine, pulling into position with a minimum loss of time. The half-swing feature of the Keystone makes "spotting" easy, and the operator can "shoot" each bucketful at exactly the proper instant by means of the electric trip.

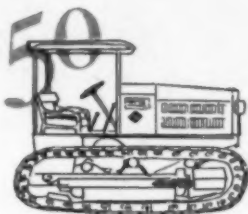
The electric trip makes the Keystone *the* Skimmer-Pullscoop Power Shovel. It is flexible, adequate and low in cost.



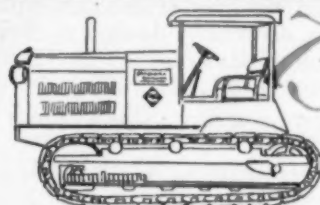
KEYSTONE DRILLER CO.
BEAVER FALLS, PENNSYLVANIA
170 Broadway, N. Y. — Waukegan, Ill. — Joplin, Missouri

9-D-59

Being up-to-date



FIFTY
Price \$3540.00
F. O. B. Springfield, Illinois



SEVENTY-FIVE
Price \$5350.00
F. O. B. Springfield, Illinois

- is largely a matter of improvement

WHEN you look at the Allis-Chalmers-Monarch, one of the first things you notice will be the many mechanical improvements provided on it without extra cost.

You will see a Pur-O-Lator, the very latest in oil filters, furnished to add years of life to your tractor. You will find an Air Cleaner of the most modern type and of ample size, included to insure long life and freedom from breakdowns. And, if you look still further, you will see a full pressure, force feed lubrication system, designed to reduce wear on moving parts.

If being up-to-date is largely a matter of improvement, the Allis-Chalmers-Monarch is the most up-to-date track-type tractor on the market—and the logical tractor for you, if you buy for years to come.

ALLIS-CHALMERS MANUFACTURING CO., *Monarch Tractors Division*, Milwaukee, Wisconsin



Monarch Tractors



Universal Quality Now Talks Price

NEVER has a Universal, despite its previous reputation for highest quality, offered so many important mechanical, money-making features as the Universal-35.

The proven, reliable Universal superstructure, newly improved, better than ever, has been mounted on a Thew 2-Speed Center Drive Crawler.

A rope crowd Center Drive shovel, that digs and dumps higher than any like $\frac{1}{2}$ -yd. machine, has been added. Crane, Dragline, Skimmer and Backdigger booms are also available.

Measured by any standard, quality construction, advanced design, performance or price, the Universal-35 is "The Greatest Value in a $\frac{1}{2}$ -yd. Machine."

Bulletin 45-K fully describes the best buy in a $\frac{1}{2}$ -yd. machine. Write for a copy today!

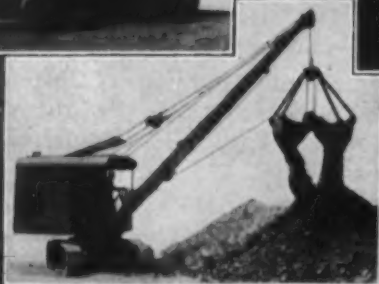
THE UNIVERSAL CRANE COMPANY
1346 E. 28th St., Lorain, Ohio

The 2 speed Center Drive Crawler outmaneuvers them all! The Center Drive Shovel digs and dumps higher! The Universal Superstructure outperforms them all!



ALSO AS A
MOTOR TRUCK
CRANE

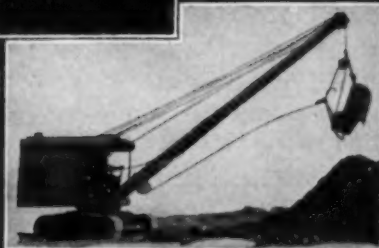
CLAMSHELL
OR CRANE



BACKDIGGER



SKIMMER SCOOP



DRAGLINE

UNIVERSAL-35



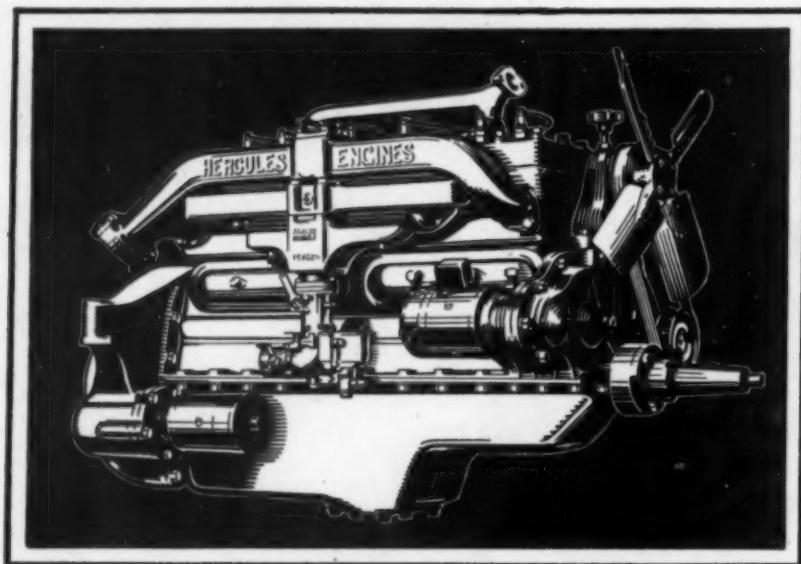
**"Blue Center" Steel
Wire Rope**
**SERVES
THEM ALL**

ROEBLING

"Blue Center" Steel Wire Rope is demonstrating its superiority wherever hard duty is encountered. Replacements are annoying and expensive. The long life of "Blue Center" reduces the number of replacements and thus lowers the operating cost.

John A. Roebling's Sons Company
Trenton, New Jersey

1st



at the ROAD SHOW

Of all the exhibitors at the Cleveland Road Show using gasoline engine power within the Hercules range, 26% featured Hercules Engines.

The definite swing toward Hercules indicates conclusively that Hercules Engines and Power Units, both four and six cylinder types, have won outstanding leadership in the heavy duty field—that Hercules performance, steady and sure, contributes to faster schedules, permits more efficient planning of work and lowers power costs.

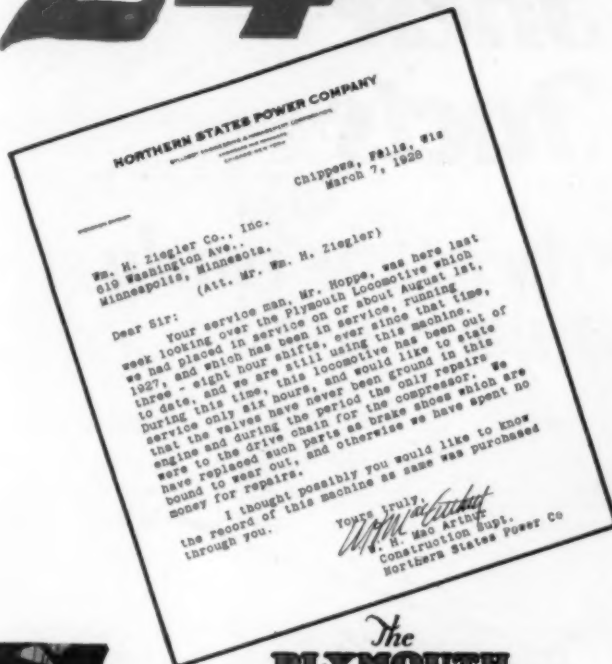
HERCULES MOTORS CORPORATION
CANTON, OHIO, U. S. A.

West Coast Branch: Los Angeles, Cal.



HERCULES ENGINES

In Service 24 Hours a Day for 7 Months



Doing three eight hour continuous shifts and actually out of service only six hours in the seven months.

Read Mr. MacArthur's letter to our Minneapolis representative, Wm. H. Ziegler Co. This is truly an unusual demand and test but the Plymouth again delivered the goods.

At Chippewa Falls, Wisconsin, Northern States Power Company started construction on a dam and power house on August first, 1927, and it was placed in full operation on June fifteenth, 1928. The job required 30,000 yards of concrete, 50,000 yards of rock excavation and 25,000 yards of earth excavation and fill.

The Plymouth 14 ton Gasoline Locomotive traveled a one-half mile track having a 1.75 percent grade and 200 foot radius curves hauling a gross load of forty-seven and one-half tons in two cars. Delivering seven hundred net tons on thirty-five gallons of gasoline (per day-24 hours) every day except six hours, for seven months.

PLYMOUTH LOCOMOTIVE WORKS

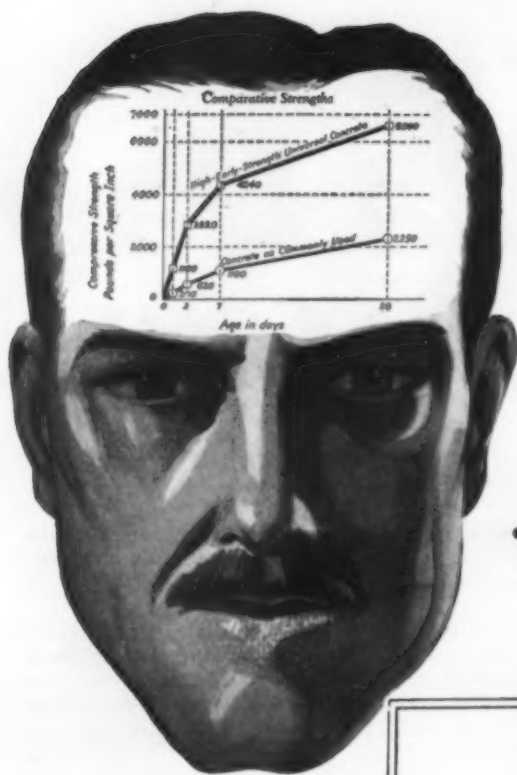
The Fate-Root-Heath Company

299 Riggs Avenue, PLYMOUTH, OHIO



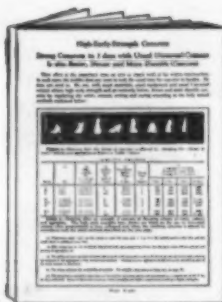
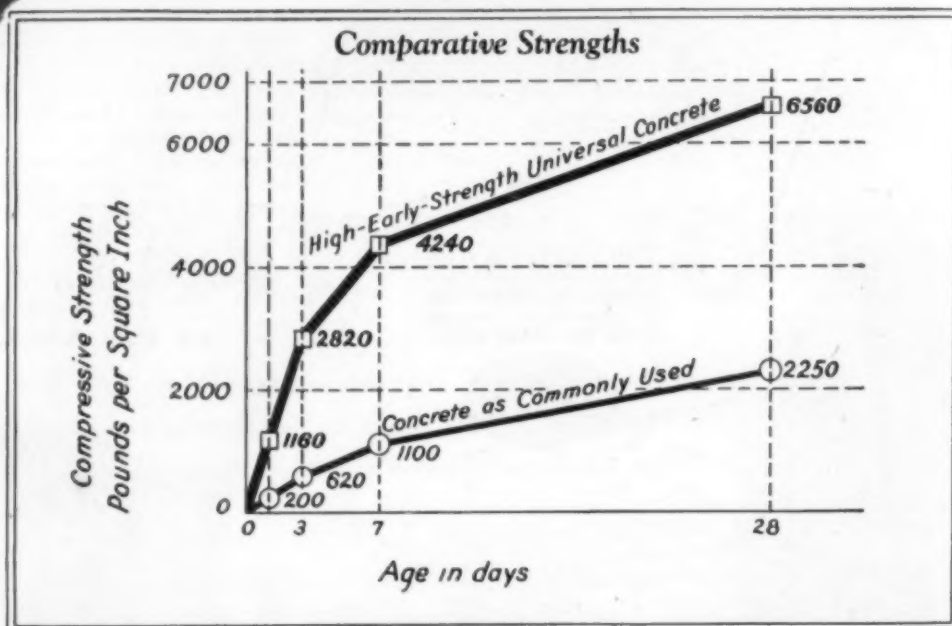
PLYMOUTH

Gasoline and Diesel Locomotives



Store These Facts

where they'll be ready for your use



Send the coupon for your copy

Name _____

Address _____

Universal Portland Cement Co.
208 So. La Salle Street, Chicago
Without obligation, please send me
your new booklet giving full
details for securing strong
concrete in 3 days with
the usual materials
and labor.
C.M. 3-39

A working knowledge of the latest information on high-early-strength concrete becomes more and more vital to all builders.

The above graph gives an instant and lasting idea of both high early and high permanent strengths obtainable with the usual Universal portland cement. The booklet at the left is chock-full of photographs with brief descriptions of jobs on which *High-Early-Strength Universal Concrete* has saved both time and money. Condensed, easy-to-use tables give the methods by which it is made.

Store the facts contained in both graph and booklet where they'll be ready for use when next you need 3-day concrete or water-tight, durable concrete!

One Standard Cement for All Concretes and Mortars
Universal Portland Cement Co.

Subsidiary of UNITED STATES STEEL Corporation

Chicago Pittsburgh Minneapolis Duluth Cleveland Columbus New York

Concrete for Permanence

Construction Methods

McGraw-Hill Publishing Company, Inc.
JAMES H. MCGRAW, Chairman of the Board
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A monthly pictorial of field practice and equipment illustrating successful construction, maintenance and material-handling methods for general construction, highways, buildings, industrial plants and public works and utilities

ROBERT K. TOMLIN, Editor

WILLARD CHEVALIER
Publishing Director

VOLUME 11

NEW YORK, MARCH, 1929

NUMBER 3

HYDRAULIC EARTH-MOVER (right) picks up a load in a pumice bed. The driver can control the scraper by means of the hydraulic apparatus to gouge a deep gash or to skin the surface.

TAKING 5 YD. (below) to the place in the fill where it will do most good. The scraper can spread the load to a depth as thin as $\frac{1}{4}$ in. Its broad wheels help to compact the fill.



Scraping the Grade for a LOGGING RAILROAD

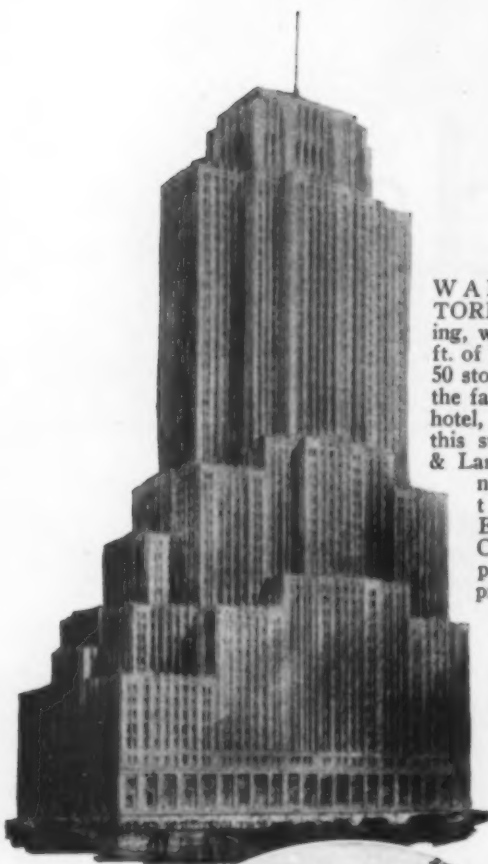
TWO McMillan hydraulic scrapers, controlled from the driver's seats of the 10-ton Caterpillar tractors which pulled them, graded a railroad line in the China Hat district of the Deschutes National Forest for the Brooks-Scanlon Lumber Company, of Bend, Ore. Each scraper hauled and dumped 5 yd. of earth. Its operation was so precisely controlled

through the hydraulic mechanism by the driver that it was possible either to dig deeply into a hole or merely to scrape the surface. In dumping, the operator could distribute the load as accurately as desired. Scrapers would spread earth to a depth of $\frac{1}{4}$ in.

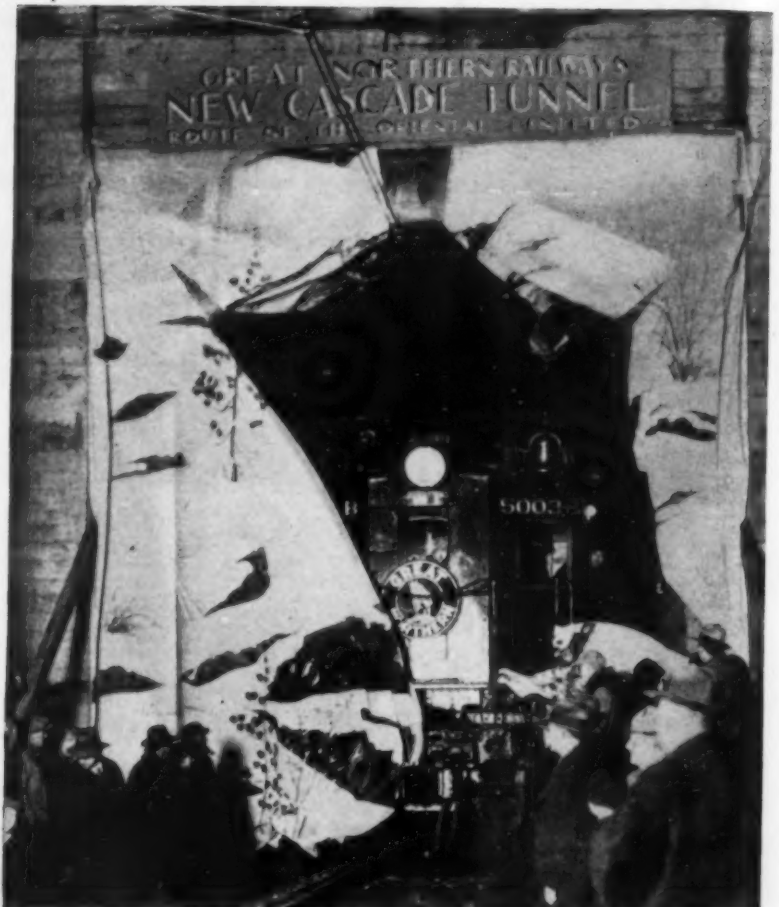
All grading for the railroad was done with the two hydraulically operated earth-movers. The work was in very

rough country over a mile above sea level. On one 33-ft. fill the two scrapers dumped 20 yd. on the grade every $4\frac{1}{2}$ min. Constant moving back and forth of the 10-ton tractors and heavy scrapers, with their broad wheels, compacted the fills and made allowance for settling unnecessary in most cases. Two of the company's five 10-ton Caterpillars were detailed for this work.

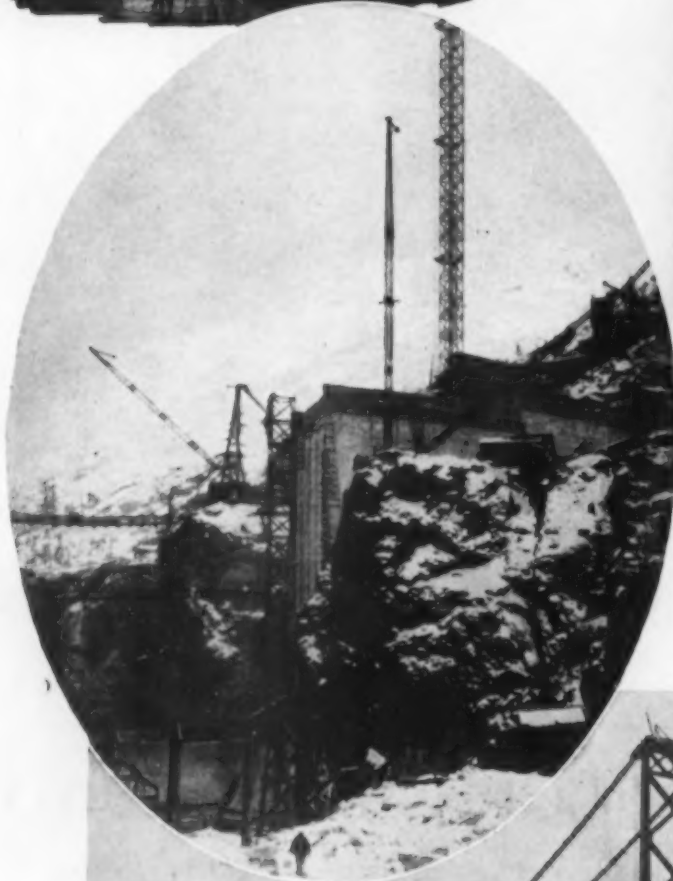
This Month's



WALDORF-ASTORIA office building, with 2,250,000 sq. ft. of floor space in its 50 stories, will replace the famous New York hotel, to be wrecked this summer. Shreve & Lamb designed the new building for the Bethlehem Engineering Company, which purchased the property recently.



CRASHING THROUGH the papier maché replica of the mountain side covering the west portal of the Cascade Tunnel, the Oriental Limited, of the Great Northern Railway, officially opens the new line to transcontinental traffic. See article pp. 34-38.



DIABLO DAM (left), which Winston Brothers Company, Minneapolis, is building for the city of Seattle on the Skagit River, is about 30 per cent complete. Approximately 50,000 cu. yd. of concrete has been placed on the right side of the canyon.

CABLES (below) for the 1,850-ft. suspension span of the Detroit River Bridge have been spun. The Keystone State Corporation is doing the cable work under subcontract with the McClintic-Marshall Company, general contractor.

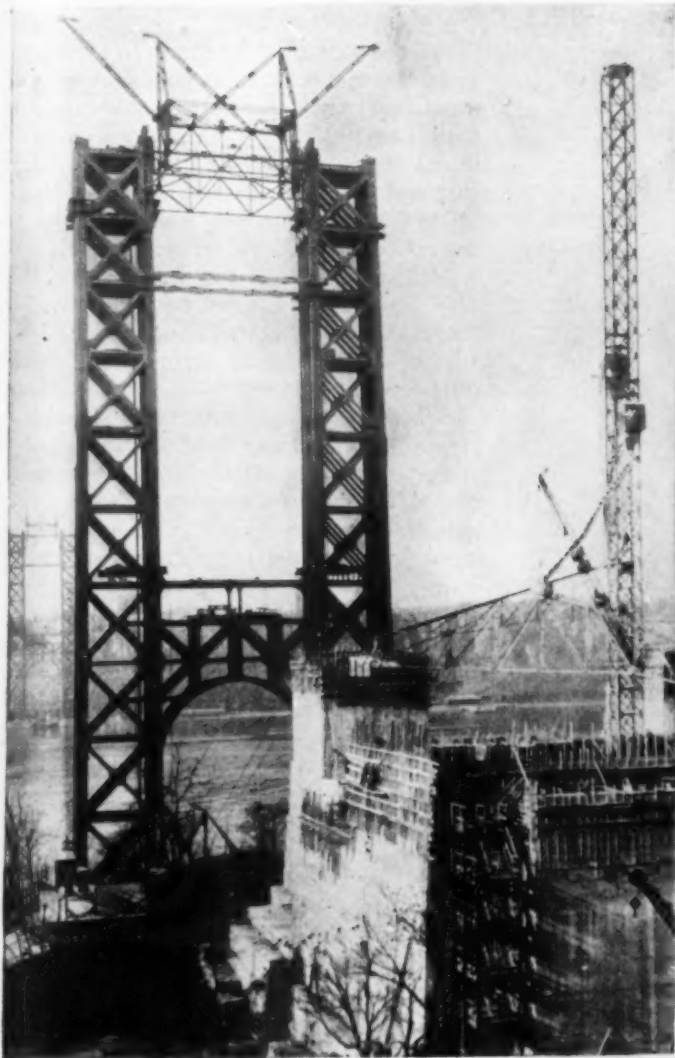


SKYS high, a suspens bridge, anchor

"News Reel"

PACOIMA DAM (*below*), 384 ft. high, on Pacoima Creek in the San Fernando Valley, Calif., was built by Bent Brothers, Los Angeles, for the Los Angeles County Flood Control District. The reservoir has a capacity of 9,000 acre-ft.

©P&A

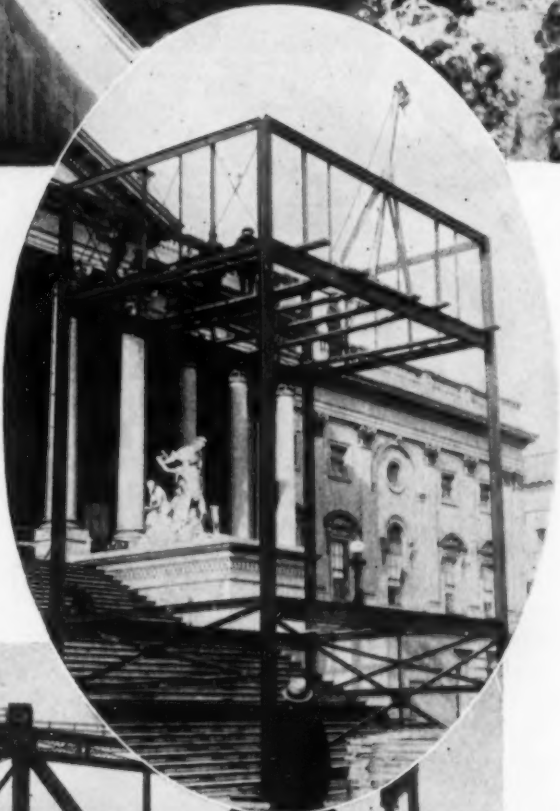


©Ewing Galloway

SKYSCRAPER TOWERS, 600 ft. high, are nearing completion to carry suspension span of Hudson River bridge, New York. The New York anchorage (at the right) contains 107,000 cu.yd. of concrete.

STEEL STANDS (*right*), were erected in front of Capitol for Hoover inaugural exercises March 4.

©P&A



SUPPORTED BY TIMBER CRIBS (*below*) on barges, 40 ft. above the water, the 300-ft. lift span of the San Mateo bridge across San Francisco Bay approaches the piers on which it is to rest.



BORING THROUGH

Contractor Finishes Eight-Mile



BATTERY OF STOPERS on column mountings drill the holes to enlarge the center heading to full tunnel section.

ON JANUARY 12, 1929, the Great Northern Railway Company formally opened its new 7.79-mile tunnel, completed three weeks previously, in the Cascade Range, 90 miles east of Seattle, Wash. The contractors for the driving of this single-track bore through the granite backbone of the Cascades, A. Guthrie & Company of St. Paul, Minn., signed the contract for the work on Nov. 26, 1925. In three years they accomplished what all precedent would lead one to believe ought to take twice as long.

The new tunnel, as the map and profile indicate, replaces an older 2.63-mile bore 500 ft. higher. It rises 500 ft. from west to east on a grade of 1.565 per cent. Enlarged by drilling operations to a width of 18 ft. and a height of 25 ft., the heavy concrete lining reduces the size to 16 ft. wide by 21 ft. 5 in. high from tie to crown of arch.



SHIFTER checks his shots in memorandum book as electrician tests the circuit after holes are loaded and wired ready for shooting. Acetylene lamps displace electric lights to avoid danger of firing charge by induction.

Construction Plan—Both portals being accessible from the railroad, they presented logical points of attack. In this region of heavy precipitation, fear of encountering underground water in large quantities caused the contractors to prepare a plan which would have taken care of driving the east end even if the downgrade workings had been flooded out. Mill Creek crosses 622 ft.

above the axis of the tunnel 2.41 miles from the east portal. A four-compartment shaft sunk 665 ft. to grade below Mill Creek Valley created two additional working faces and opened the east end to uphill drifting.

Because of possible water trouble, the rate of progress in driving downhill from the shaft and from the east portal was uncertain. The real problem, therefore, resolved itself into the question of how the west segment of 5.38 miles could be completed in three years, the time which the contractors allowed themselves in their preliminary estimate, by driving uphill from the west portal. Obviously, numerous points of attack were necessary. The builders, therefore, selected for this operation a pioneer drift with cross-cuts at intervals of 1,500 ft. from which center headings for the main tunnel could be driven. A 9 ft. wide by 8 ft. high

pioneer tunnel accordingly was placed parallel to the center line of the tunnel proper and 66 ft. south of it—the 66-ft. distance being judged the least safe limit to prevent failure by crushing of the rock rib between the two tunnels.

Speed of construction on the east segment of 2.41 miles was not such a controlling factor, and the contractors

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THE CASCADES

Railroad Tunnel in Three Years

here determined to drive center headings from the east portal and Mill Creek, the center heading method being the most economical for this work. It was necessary that the center

drift. This fact may be better understood from the statement that a loss of one minute per round in the pioneer meant a delay of 40 or 50 hours in the completion of the tunnel. The ideal

time-cycle in the pioneer and other headings is well illustrated by a time-cycle from the west portal pioneer on a day when five rounds were pulled and mucked in three shifts:

Blast.	.....	27 min.
Ventilation	.....	27 min.
Enter drift, clean up fly rock with machine and hand muckers	.....	38 min.
Muck main muck pile	.....	1 hr., 22 min.
Remove mucker, set drill carriage	.....	38 min.
Drill	.....	1 hr., 17 min.
Load and retire	.....	18 min.
Total time of round	.....	4 hr., 40 min.
28 holes, average depth 8 ft. 6 in.		
195 lb. powder, DuPont 60 per cent gelatin.		
7 ft. 6-in. advance.		
9x10-ft. cross-section.		
4 Denver No. 17 drills on Sullivan carriage.		
Rock, altered granite.		
16 men, including shifter and mucker boss, underground.		
28 50-cu.ft. Koppel cars loaded.		

The drifting crew at the west portal set a world's record during the month

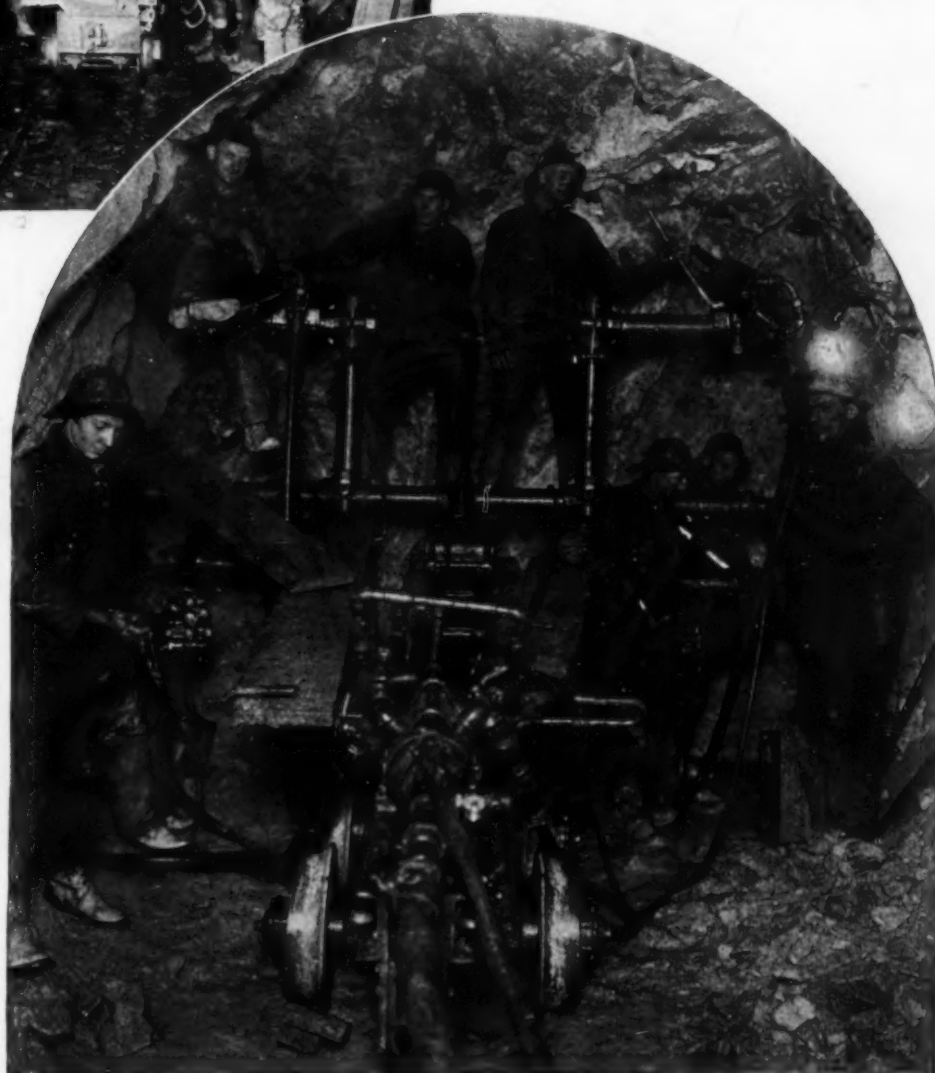


SWITCHING a 50-cu.ft. car in the pioneer drift with one of the air-operated 24-in. gage transfer hoists.

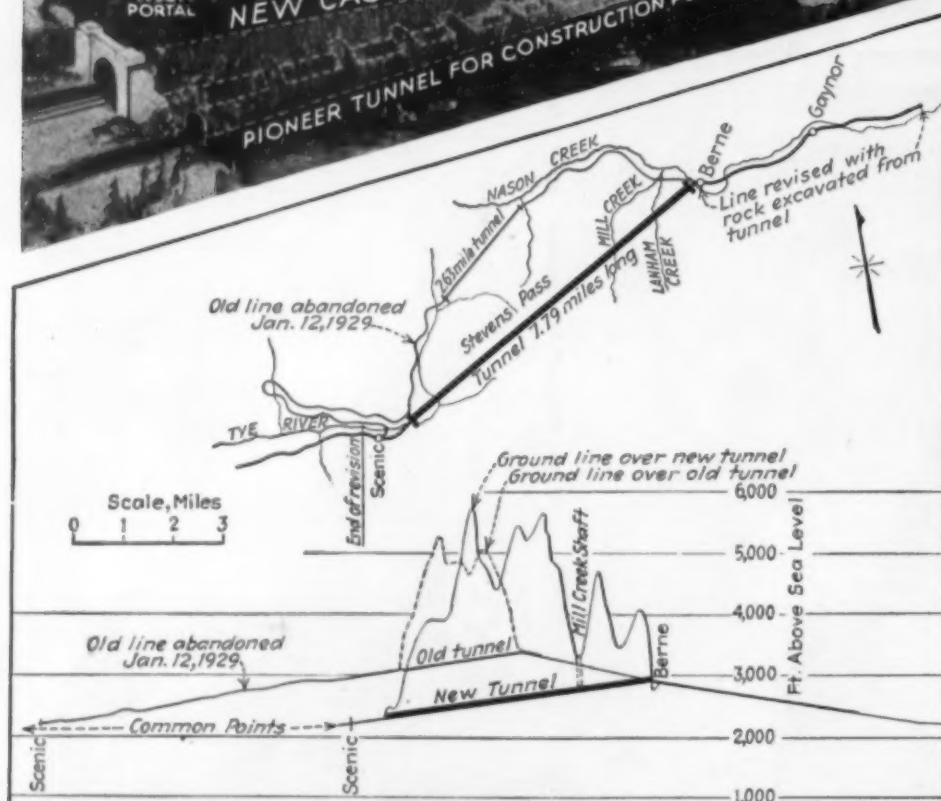
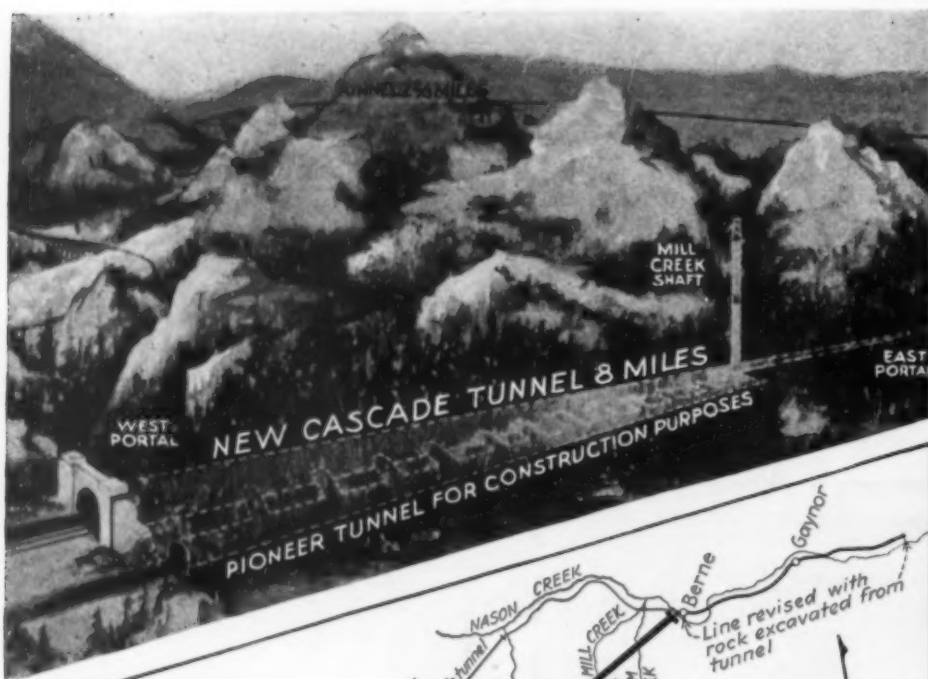
headings meet, thus providing two openings, before enlargement operations could start at the east portal. Men, tools, air and water lines, and explosives for the ring drilling and blasting of the enlargement reached the working face from the Mill Creek shaft, while muck was hauled out through the east portal.

Power Supply—Pending the construction of transmission lines to supply electric power from outside sources, the contractors started all tunnel operations with gasoline-driven portable air compressors and lighting plants. To carry the load at west portal during the eight months required to bring power from the coast to this point, a 1,200-hp. generating plant of three-phase, 2,300-volt, 60-cycle generators, driven by Fairbanks-Morse Diesel engines, was installed. A similar plant, of 720 hp., at Mill Creek was installed as a stand-by to furnish power for the shaft pumps in case the transmission line should be put out of service.

Drifting Operations—Completion date of the tunnel depended primarily on the rate of progress in the pioneer



DRILL CARRIAGE mounting four drills ready to start a fresh round in the pioneer tunnel. Air and water lines are connected to the manifold on the carriage.



PERSPECTIVE, MAP, and PROFILE of the old and new lines. The pioneer tunnel, with cross-cuts at 1,500-ft. intervals, makes it possible to drive center headings for the main tunnel at a number of points.

of October, 1926, when it advanced a drift of 8x9-ft. cross-section 1,157 ft. in 31 calendar days.

Drilling—Sullivan drill carriages were used in the west portal pioneer and in drifting operations from Mill Creek shaft. The use of a drill carriage made it necessary to divide the cycle of a round into two distinct parts, because mucking and drilling could not be carried on simultaneously. This delay in starting the drilling, however, was more than compensated by the speed of the operation itself; and drifting by this method proved faster and, consequently, more economical than the usual practice, employed in the east portal center heading, of starting the drilling from a horizontal bar mounted over the muck pile. Hollow 1½-in. diameter new process crucible drill steel was used in all headings; the

drills were Denver 17 and Ingersoll-Rand R-72. Chicago Pneumatic CP-50 sinkers were selected to open the Mill Creek shaft. Denver stopers on column mountings in the center headings drilled the holes to enlarge the tunnel section.

MUCKING MACHINE (below) in pioneer tunnel discharges into 50-cu.ft. car attached to 6-ton trolley locomotive.



BOOSTER STATION on the air line inside the pioneer tunnel. Relay fans are installed at intervals on the line.



AIR-OPERATED SHOVEL (above)
of 1½-cu.yd. capacity loading a 6-cu.yd.
car in the main tunnel.

Mucking—Myers-Whaley mucking machines loaded the broken rock in all drifts. A Myers-Whaley mucker could load a round of 32 yd. of coarsely broken granite, including the time necessary to clean up fly rock, in 1 hour and 30 minutes.

Marion Model 40 railway type shovels, mounted on crawler treads and operated by compressed air, maintained the necessary mucking speed in the enlargement. These shovels were equipped with slide valve engines intended for steam operation. To prevent freezing at the exhaust, the boilers were replaced with air receivers, 4 ft. in diameter and 7 ft. 6 in. long, warmed by 18 General Electric 220-volt immersion heating units connected at 110 volts to prevent destruction by overheating.

Hauling—In selecting equipment for hauling the muck from the headings, the object was to get a car of maximum capacity in order to reduce the number of switches necessary per round. Koppel 50-cu.ft. 24-in. gage steel side dump cars were chosen as the largest available units which could be loaded within the limits of the Myers-Whaley shovels and which could pass each other in the 9-ft. width of the pioneer tunnel. The enlargement shovels loaded into Koppel 6-cu.yd. 3-ft. gage side dump cars with wood bodies, selected on the same basis.

The pioneer tunnel and center heading operations were served by 6-ton 24-in. gage General Electric trolley locomotives equipped with gathering reels holding 500 ft. of cable. For loading from the enlargement faces, the locomotives were 20-ton, 36-in. gage General Electric trolley type, similarly equipped with gathering reels.

Switching—To reduce the delay in switching, the contractors determined upon the transfer method of moving cars from track to track. A crane immediately behind each loading machine picked up an empty car and transferred it to the loading track as soon as the last loaded car was hauled clear.

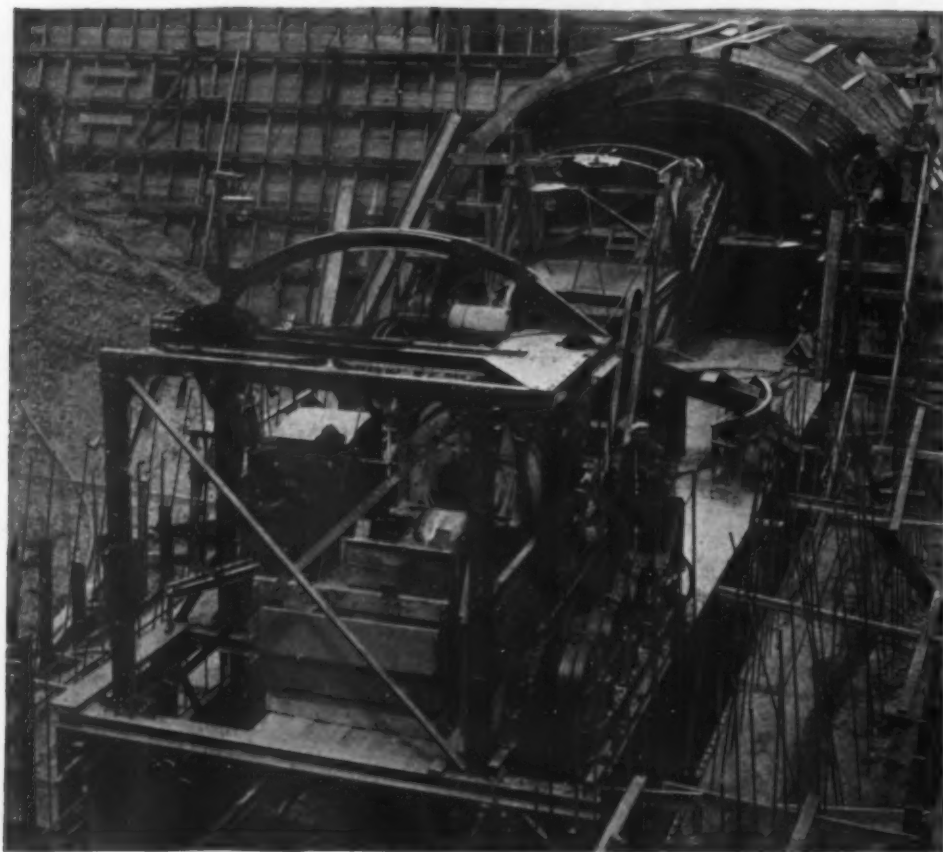
Utilities—Air for ventilation was conducted into the workings through 20-in. diameter, 18-gage, galvanized, riveted and soldered pipe connected by a special packed joint in which felt was strapped over the pipe with a bolted collar. The contractors laid all compressed air and water lines over 2 in. in diameter with so-called "gas line" pipe, which is about 50 per cent lighter than wrought iron pipe of equal diameter. They connected the pipe lengths with Dayton couplings.

All underground lighting circuits were three-phase, 60-cycle, 220-volt, while those on the surface generally were 110-volt. The electric locomotives were operated on direct current at



TRANSFER HOIST on the rear end of the shovel frame switches the cars by lifting them from track to track.

W. E. CONROY (left), FREDERICK MEARS and J. C. BAXTER, who supervised operations for the owner and the contractors.



TRAVELING CONCRETE PLANT which moves forms and mixes and places concrete by gravity or pneumatic methods. The travelers cause no interference with muck trains.

275 volts, supplied from motor-generator sets driven by three-phase, 60-cycle, 2,300-volt motors. The first motor-generator sets were placed outside the tunnel, but additional substation units were installed inside the tunnel as the length became too great for 275-volt d.c. transmission.

Two-stage compressors direct connected to three-phase, 60-cycle, 2,300-volt synchronous motors supplied compressed air for all the workings. Each of eleven Sullivan 18-11-14 angle compound compressors, at the three camps, furnished 950 cu. ft. per minute. One Ingersoll-Rand duplex 19-11-14 added 988 cu. ft. a minute to the supply at Mill Creek.

Mill Creek Shaft—The Mill Creek shaft was designed for balanced hoisting. Two Ottumwa single-drum hoists were used: the primary handled two

70-cu. ft. capacity Kimberly skips in balance at a maximum speed of 885 ft. per minute and the secondary operated the man and material cage at a speed of 700 ft. per minute. Because of the contractors' apprehension regarding the amount of water to be encountered, Mill Creek shaft was supplied with pumps giving a capacity of 3,500 g.p.m., which was being fully utilized at the time of holing through.

Concreting—The work of lining the bore with the thick concrete walls followed closely upon the enlargement operations. A proportioning plant was installed at each end of the tunnel from which dry batches were hauled to the traveling concrete plants inside. The eight concrete travelers placed 264,000 cu. yd. of concrete by gravity and the pneumatic method without interfering with the passage of muck trains.

Personnel—J. C. Baxter, vice-president of A. Guthrie & Company, developed the plan of attack and supervised all operations. R. F. Hoffmark, general superintendent, directed construction procedure for the same firm. In more immediate charge in the field were W. E. Conroy, resident-superintendent, and C. G. Jones, F. J. Kane and H. J. King, superintendents at Berne, Mill Creek and Scenic, respectively. For the Great Northern Railway Company, Frederick Mears, assistant chief engineer, was in charge of construction and the difficult surveying which preceded it. J. R. W. Davis, chief engineer, exercised general supervision. M. J. C. Andrews was resident engineer.



THE MILL CREEK HEADFRAME was built back from the shaft and later was jacked forward into position on greased skids.

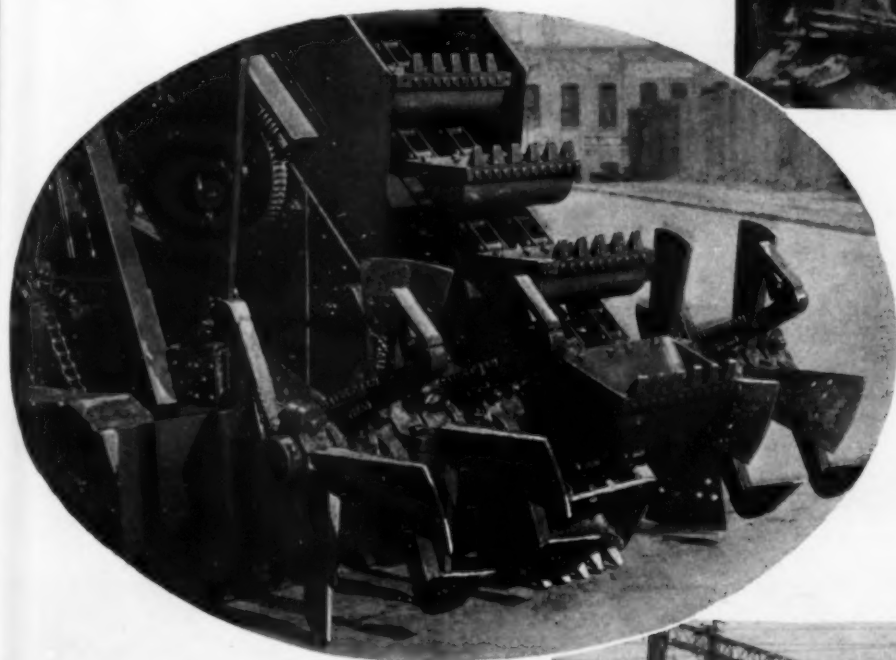
Street Grader Excavates an Underpass

A NEW machine winning its spurs in an unexpected way forms the essence of the story told about the Haiss excavator in Chicago, where one of the first machines in the district dug an opening 110 ft. wide for an underpass beneath eight busy tracks of the Illinois Central Railroad. The grade of the excavation is about 19 ft. below the tracks, which are on a fill 14 ft. high.

The Rawson-Walker Company, contractor on the job, first drove thirteen pile bents on 13- to 14-ft. centers under each track, aligning the bents in rows to form twelve bays running through the fill one side to the other.

The new machine, designed primarily for road and street grading, is an excavator of the endless chain and bucket type, carrying the excavated material on the upper run of the ladder. Its cast-steel buckets are equipped with individual power shovel-type manganese steel teeth. The foot-shaft, extended to a total width of

TRUCKS haul away the spoil discharged from the upper end of the elevator. The excavator backs into the bank, clearing an 8-ft. roadway for the trucks.



FOOTSHAFT operates digging picks which excavate material to be pushed along to the bucket chain by the propeller blades on the shaft.

8 ft., operates digging picks fitted with manganese steel power shovel points. Propeller blades on the shaft extensions push the picked material toward the elevator bucket chain, which deposits it in a truck along with the material excavated by the buckets themselves.

The Rawson-Walker Company removed the material beneath the Illinois Central tracks by backing the exca-

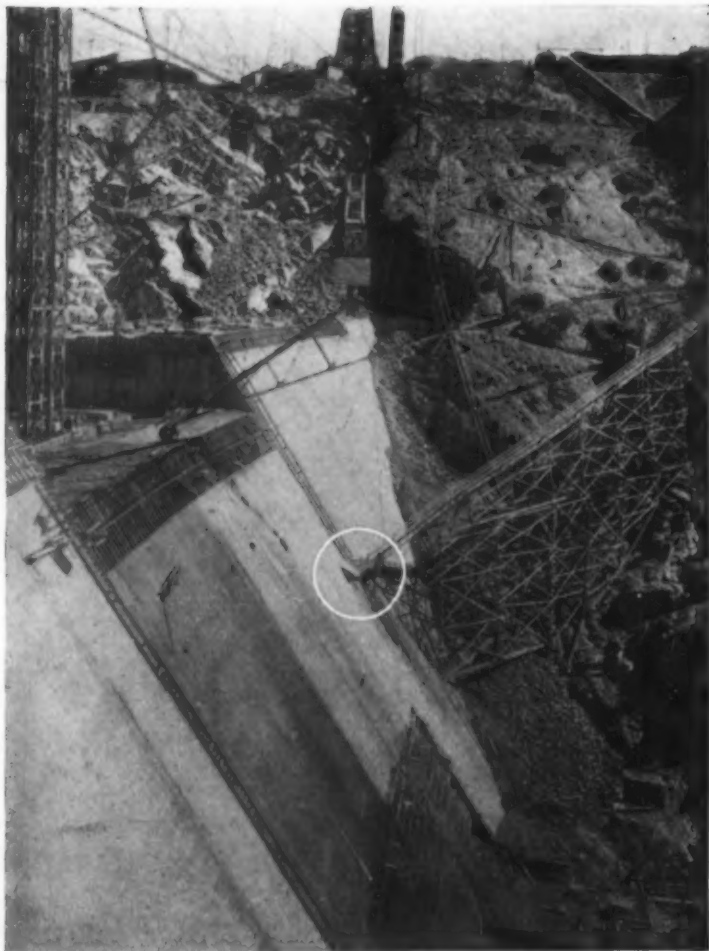
vator into each bay, the machine digging its way through from one side to the other. It loaded a 6-yd. truck in 3 to 5 min. Output averaged from 300 to 400 cu.yd. in 8 hours with a total excavating force of one machine operator and four laborers.

The digging and discharging elements of the excavator being at opposite ends, the machine was able to operate continuously in the 13- to 14-ft. bays, clearing an 8-ft. width for the 6-yd. trucks. Its over-all height, 15 ft. 9 in., fitted neatly into the vertical clearance at 16 ft.



PILE BENTS in rows carry the eight tracks on steel beam stringers. Excavator eats its way through one bay after another.

Getting Down to DETAILS

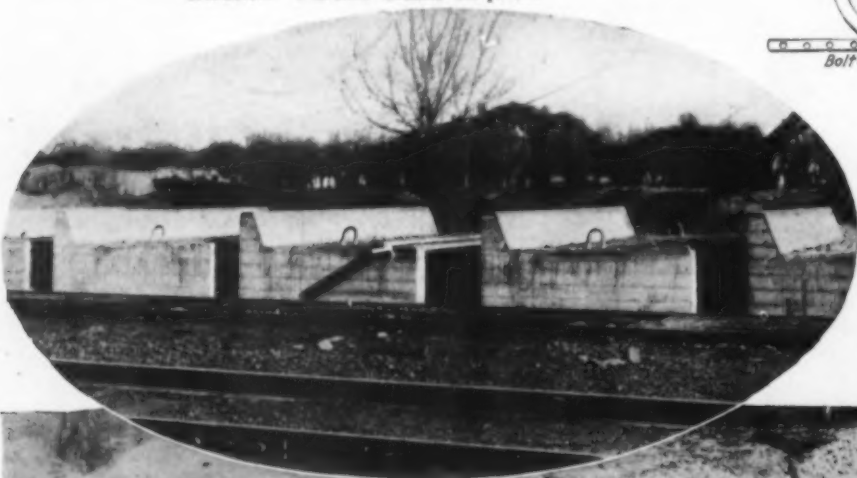


PIERCING THE PARDEE DAM, this chute from the mixing plant of the Atkinson Construction Company conveys wet batches through the concrete structure to the tower at the left for distribution. Further details on p. 54.

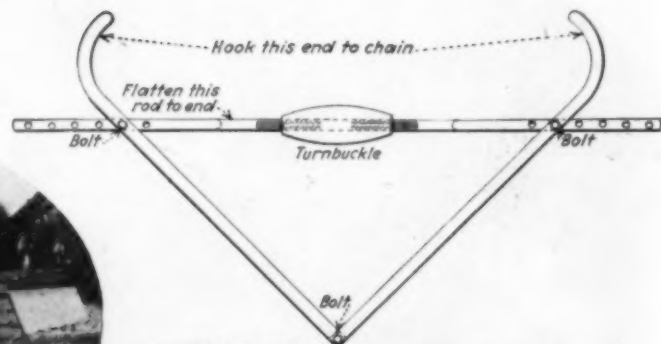


©La Technique des Travaux.

VAGNEUX TIES on the Nord Railway, France, are a semi-rigid combination of steel I-beam and reinforced concrete blocks. Rails are attached by screws which twist into screw boxes molded in the concrete and reinforced with helicoidal liners of flat steel wire.



PRECAST SLABS form deck of small concrete bridges which engineers of Denver & Rio Grande Western Railroad designed to replace timber pile structures under traffic. Hooks are cast in slabs for handling by cranes. Flanges retain ballast.

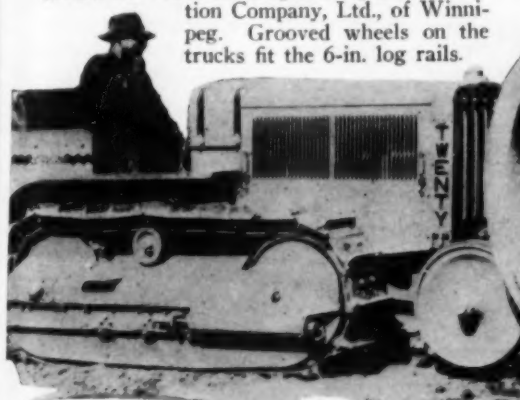


COUPLING TOOL (above) for connecting loose ends of conveyor or bucket chain provides clear opening in which to insert links. Threaded shafts of turnbuckle member and two legs of 'V' are flattened at bolt holes.

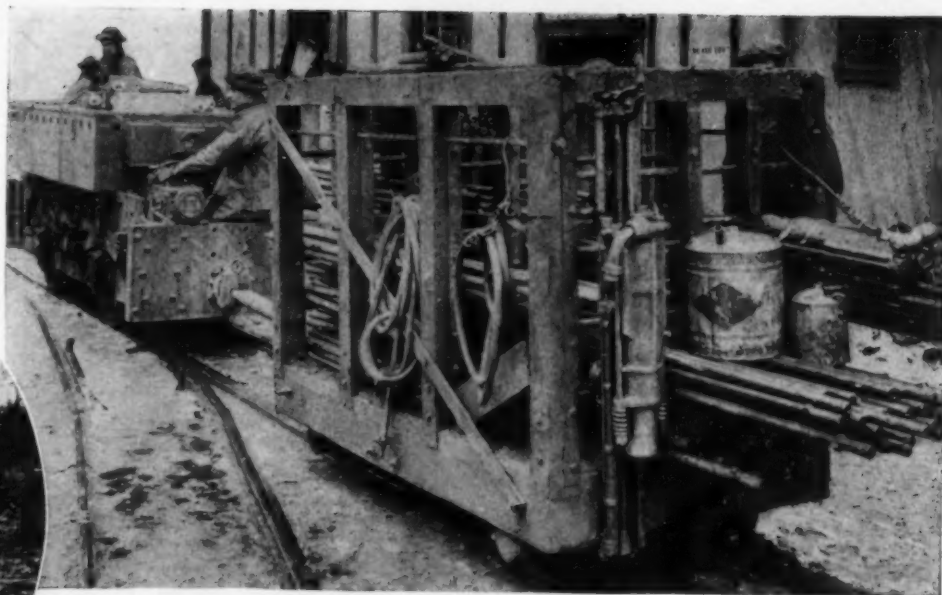
Close-up Shots
of Job
Methods and
Equipment



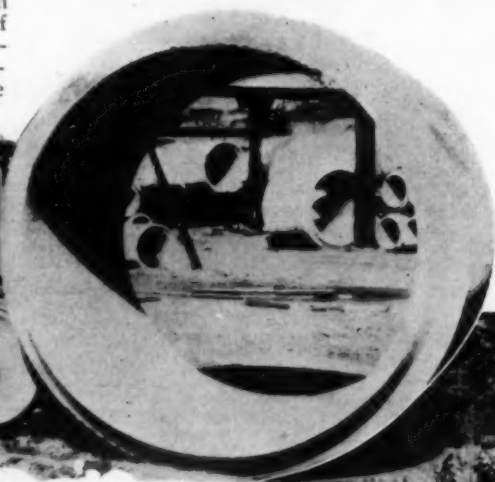
TIMBER TRACK through swampy section of Manitoba quadruples hauling capacity of horses for Canadian Engineering & Construction Company, Ltd., of Winnipeg. Grooved wheels on the trucks fit the 6-in. log rails.



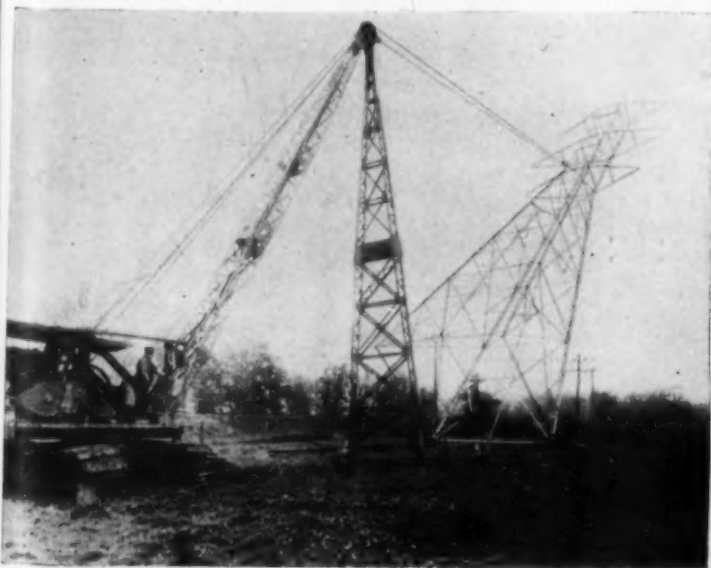
TWO WHEELS controlled from driver's seat of this Caterpillar tractor steer concrete pipe while rolling it to position in the yard of the Wisconsin Concrete Pipe & Tile Company.



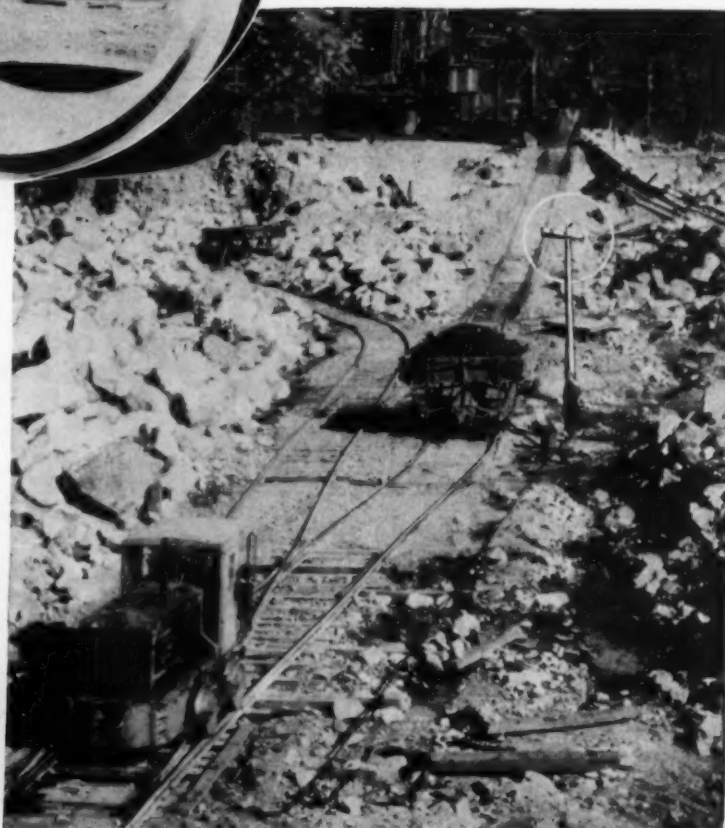
DRILL CAR carries complete set of sharpened steel for one round, two extra newly overhauled drills, several extra pieces of hose, and a supply of lubricants to the face of the pioneer bore for the new Cascade Tunnel. As each drill is used, it is replaced in the car. After drilling is finished, the car is taken to the blacksmith shop, and all steel is refitted. Full story of Cascade Tunnel construction starts on p. 34.



How about mailing
the Editor of *Construction Methods* an
interesting detail
from your job?



SHEAR-LEG ATTACHMENT of Northwest Engineering Company enables crane to erect 90-ft. towers for Public Service Company of Northern Illinois.



SEMAPHORE ARM in Bent Brothers gravel pit at Pacoima Dam, Calif., signals hoist operator on upper level when to haul car.

DOUBLE-DECKING



TWO STEEL TRUSS SPANS carry the approach to the upper deck over the approach to the lower. The end span of the bridge proper was lowered 7½ ft. at the abutment to make possible the design of more pleasing approaches.

APPPLICATION of the electric-arc welding machine and the acetylene torch to field operations greatly simplified the solution of problems encountered in reconstructing the Havre de Grace highway bridge across the Susquehanna River to provide an additional roadway. Contract for erecting an upper deck, replacing the old bracing system with an adequate substitute, and making other necessary changes was obtained by the Neeld Construction Company, of Pittsburgh, Pa., an organization experienced in this kind of work. With the aid of the advanced methods practiced by this company, the Maryland State Roads Commission transformed the old structure into a serviceable double-deck bridge of pleasing appearance.

The trusses were amply strong to carry the extra deck and were high enough to provide for two clearance heights of 12½ ft. To fit the approaches to the upper deck into the surrounding conditions as well as possible, each of the end spans was lowered 7½ ft., making a 3 per cent grade on these spans. The following operations were necessary in making the changes in the structure:

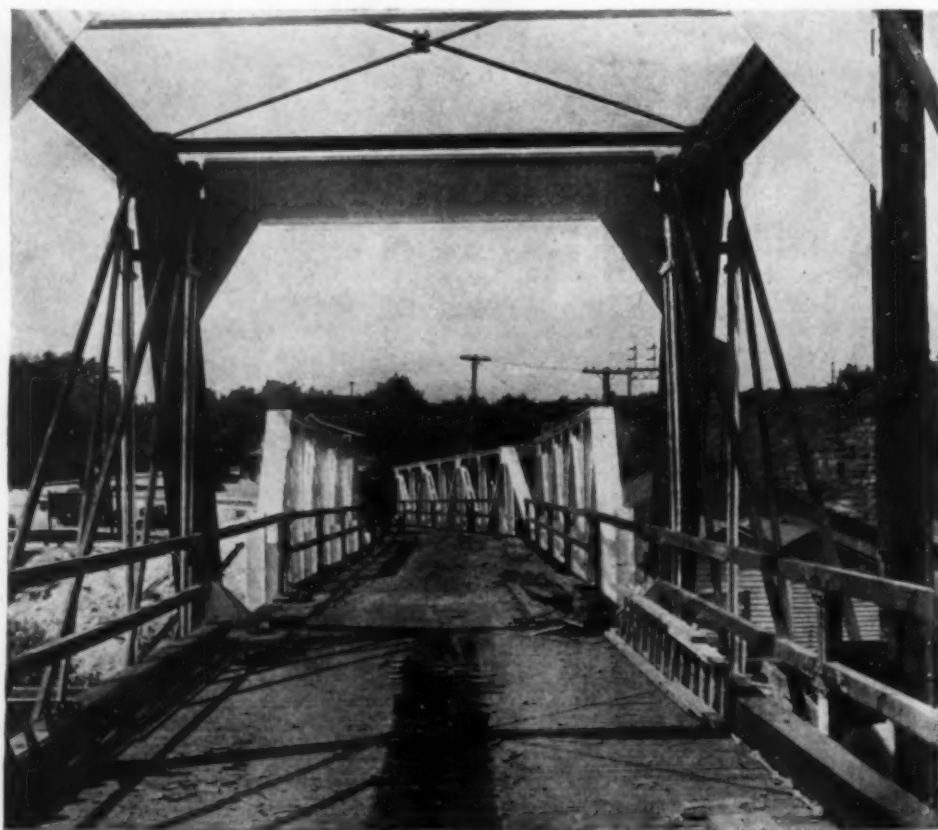
1. Remove all sway bracing at each intermediate post and provide by floor beams and gusset plates a greater stiffness than was afforded originally by the sway bracing.
2. Remove all the bracing at the portals and replace it with a new system of horizontal members only.

3. Provide a means of carrying the floor beam at the hip vertical, where only a tension member existed in the original structure.
4. Provide columns to carry the deck between the end posts of adjoining spans.

5. Strengthen the draw span to take care of the increased load when swinging.
6. Install new operating equipment on the draw span to swing the increased load.
7. Provide the necessary spans, retaining walls, etc., for the approaches.
8. Lower the trusses at each abutment.

Gusset Plate Connections—The method followed in connecting the floor beams and top chord struts to the intermediate and end posts was (1) to slot the posts, (2) to insert the gusset plates in the slots, and (3) to weld the plates to the posts. An acetylene torch was used to cut the slots, an angle guide serving as a templet. The slots were made discontinuous, and the plates were irregular in shape to fit the openings. As the photographs show, the plate extended clear through the post, projecting portions being left on the outside to provide connections for an angle truss to support a walkway. The gusset plate was electric-arc welded to the post with a ¼-in. bead for the full length of contact at each of the four intersections where the plate pierced the post.

Bolts which had their heads and nuts tack welded were used to connect the floor beams to the gusset plates. To



U-SHAPED HANGERS to carry the upper deck were placed over the existing eyebars at the hip vertical points and were welded to the nuts on the pins. Gusset plates, which form the floor beam connections at the posts, support the railing and back up the wheel guard (lower right corner of photograph).

a Highway Bridge

permit the gusset plate to be brought in full contact with the web of the beam, the flanges on one side were cut off and the plates were welded along their edges to the web. Tack-welded bolts also were used to connect the stringers to the floor beams.

Mobile Equipment—As traffic passed over the bridge all the time that work was in progress, it was necessary to use equipment which would not interfere with the passage of vehicles. For the steel erection, C. M. Neeld, who personally supervised all operations, designed a fast portable crane consisting of a McCormick-Deering industrial tractor equipped with two drums for operating an 18-ft. steel boom. This machine was narrow enough to allow nearly all traffic to pass. When a wide vehicle approached, the crane could run off the bridge quickly. This rig placed all steel requiring a boom for erection.

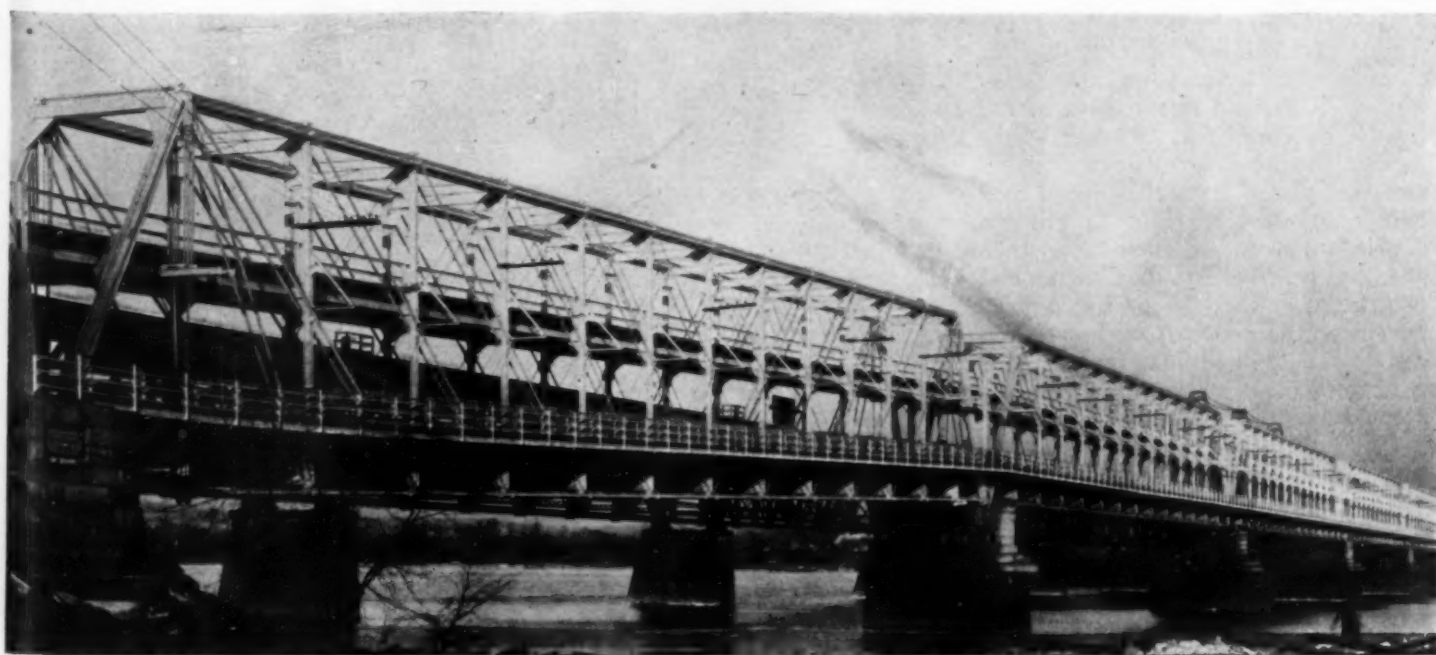
Hip Vertical Hanger—A support was necessary to carry the floor beam of the upper deck at the hip vertical hanger in the end panel of each span. In the original structure eyebars carried the floor beam at this point. An additional suspension bar was required to support the second deck. This hanger was made by cutting a plate in the shape of a narrow U, with the inside of the curve shaped to fit over the top of the existing eyebar. The hanger was placed (with the U inverted) over the eyebar, and the top of the hanger



COLUMNS erected on new bases resting on the end floor beam of the truss at each shoe carry the new deck beyond the portal.

was welded to the nut on the pin. Thus the new load was applied to the pin at the same point as the old, no additional

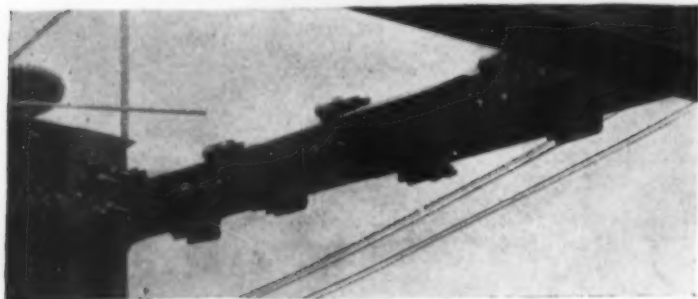
bearing on the pin was required, and the hangers for the two decks were free to function separately. Two U-



AN UPPER DECK was added to the Havre de Grace highway bridge across the Susquehanna River, originally a single track railroad bridge. The new walkway gives the appearance of a slight sag near the abutment.



C. M. NEELD with his fast tractor crane designed to erect the steel. Gusset plates of irregular shape, for floor beam connections, pierce the intermediate posts.



PERMANENT CLAMPS shorten the top chord of the draw span.

shaped hangers were used at each hip vertical point.

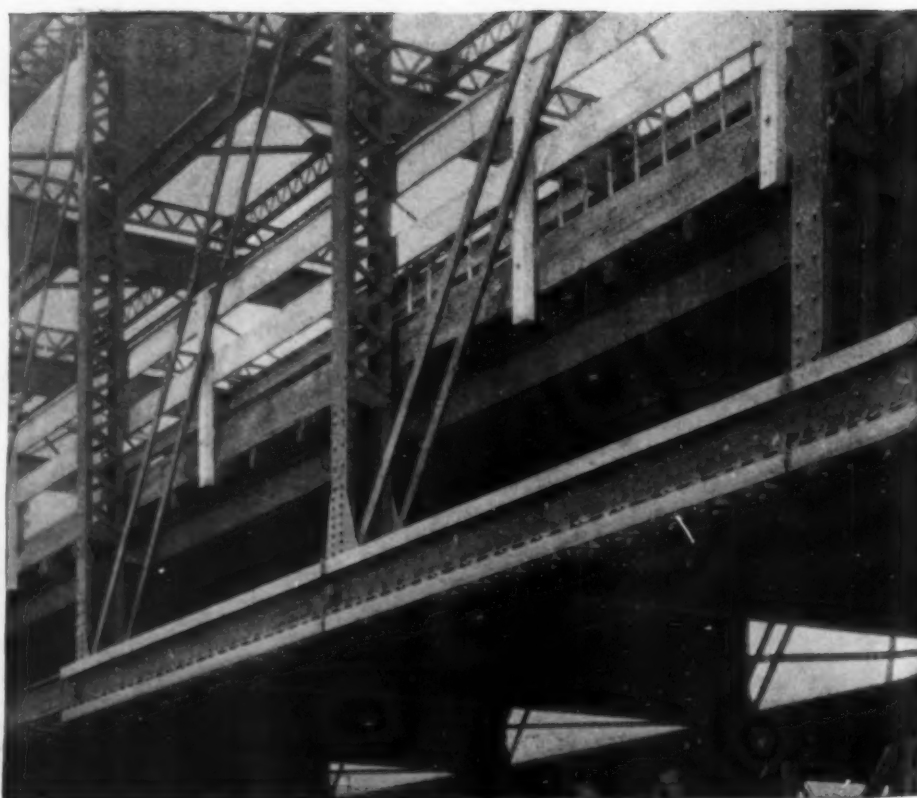
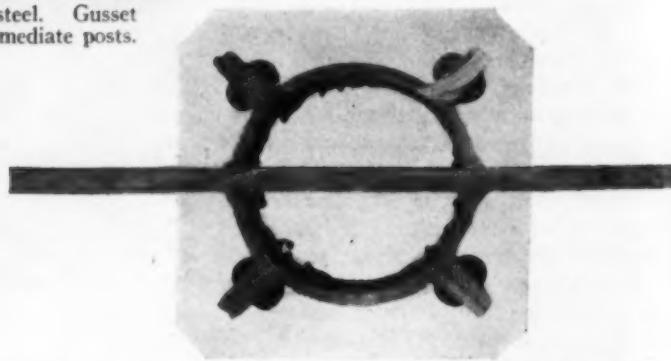
To carry the new deck between the portals of adjoining spans, Bethlehem columns were erected on new bases resting on the end floor beams of the trusses at each shoe. Gusset plates similar to those used at the intermediate posts connected the floor beams to these columns. Thus a double bent was erected over each pier, one bent being placed on the end floor beam of each of the two adjoining spans. Stringers of the upper deck run from these bents through the portals to the floor beams at the hip vertical hangers.

Portal Bracing—At the portals, it was necessary to remove the bracing entirely and to substitute a new system of horizontal struts which would provide for all lateral loads. Four angle struts, two above and two below the stringers of the new deck, were connected to the end posts by gusset plates similar in design to those described for the intermediate floor beam and top

sway strut connections. At the top of the end posts of Phoenix section, a strut was provided by connecting an I-beam by the same method. On trusses having box sections, the gusset plate was placed in contact with the cover plate after holes had been cut in the gusset plate to match the rivet spacing of the cover plate. The gusset plate then was connected to the end post by welding the holes and edges of the plate.

Draw Span Alterations—The draw span was amply strong to provide for the increased load of the second deck when closed; but, when open, the added load caused a $4\frac{1}{2}$ -in. deflection. To take care of this condition, members of the top chord over the pier were

SAWED SECTION (below) of Phoenix column with gusset plate inserted and welded, cut for examination after welding in the field. Note homogeneous character of metal.

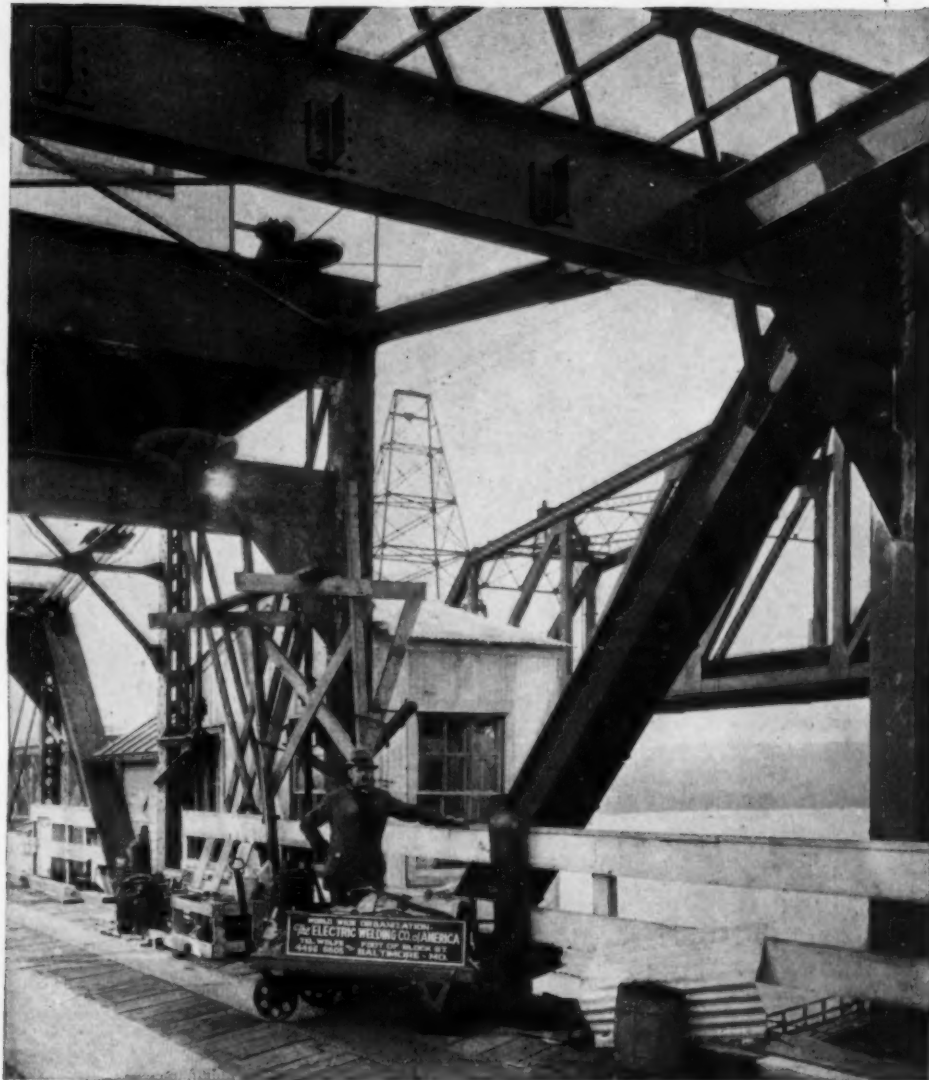


FOUR ANGLES, bolted to the bottom chord, reinforce the draw span to provide for the increased load when swinging. Note clamps on diagonal members.

shortened by the use of permanent clamps. Diagonal tension members in the trusses were shortened by the same means.

To strengthen the bottom chord four angles were bolted to the existing sections. Connections were made by removing the rivets from the old strap holes, placing washers between the straps and angles, inserting bolts in the rivet holes, and tightening and tack-welding the bolts. In order to have the new compressive members that were added and the existing tension members that were shortened take stress immediately, the ends of the draw span were jacked up while the work of strengthening the trusses was being performed. For the same reason, in connecting the angles to the

TACK-WELDING (below) of nuts and heads makes all bolts as secure as rivets.



WELDING a gusset plate along its edge to the web of the floor beam, from which the flanges on this side have been cropped to allow gusset plate to come in contact with the web. One lug angle forms the connection between floor beam and stringer.



TOP SWAY STRUTS are connected to box-section end posts by gusset plates in which holes have been cut to match the rivet spacing in the cover plate.

bottom chord, the bolts at the ends of the angles were tightened first, and wedges were driven and welded between the lengths of angle to force them tight against the existing sections of the bottom chord before the intermediate bolts were tightened and welded. The wedges used in this operation were made from the flanges of Bethlehem beams cropped for erection on the bridge. At the present time, the deflection in the draw span is the same as it was before the second deck was added.

Before the State Roads Commission awarded a contract permitting use of welded connections, it had tests made to determine the strength obtained by welding. Results were so satisfactory that the Commission felt no hesitation in specifying electric-arc welding. At times as many as six General Electric portable arc welding machines were in use. W. C. Hopkins, bridge engineer, was in charge of the design and methods involved in the reconstruction. He acted under the direction of John N. Mackall, chief engineer.

A 10-Ft. Rise

Constantly Moving Forms on Silos for

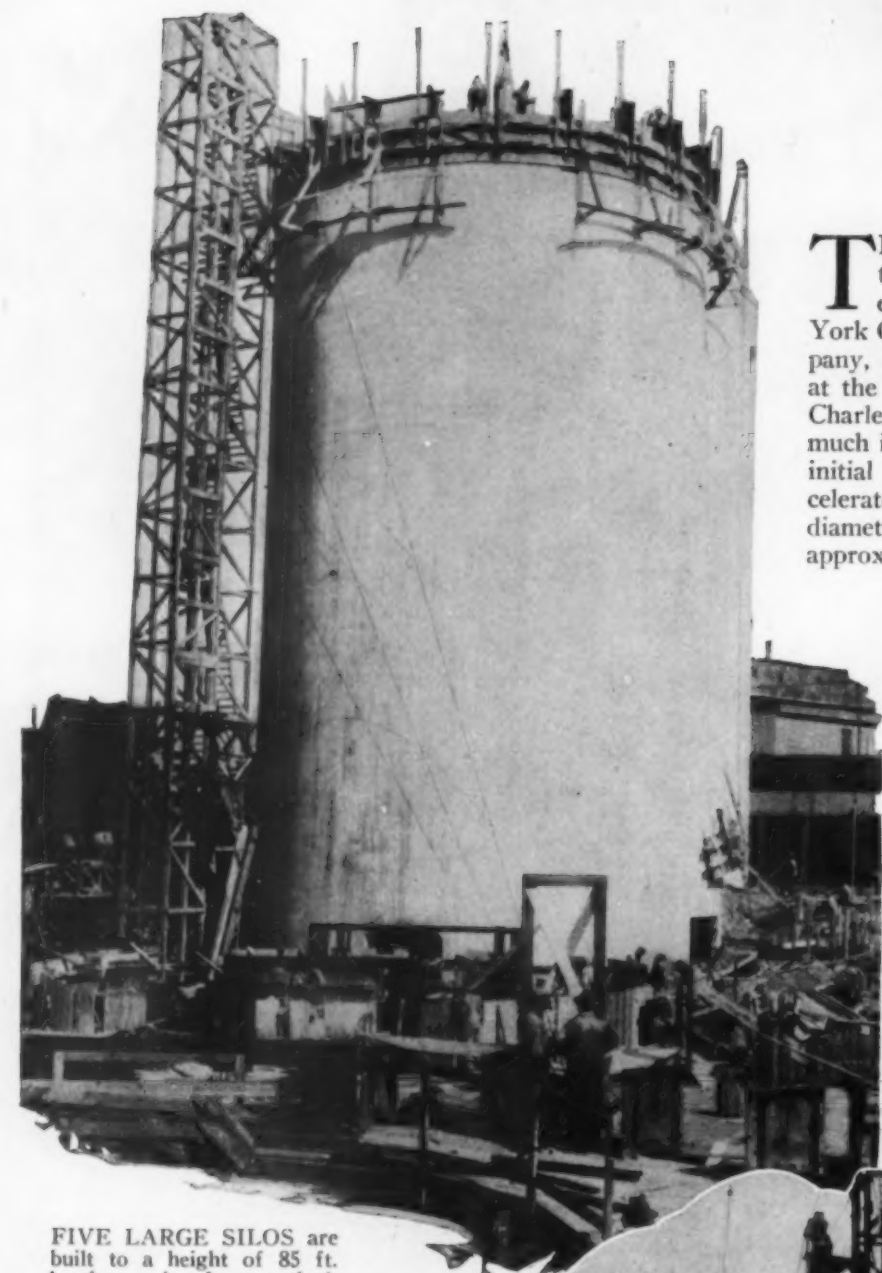
THE jack-rod method of pouring concrete in continuously moving forms as employed by the General Contracting & Engineering Company of New York City, subcontractor to the Morton C. Tuttle Company, Boston, for the construction of five large silos at the United States Gypsum Company's plant in the Charlestown section of the New England city, aroused much interest in that vicinity because it was making its initial appearance there. As usual, the method accelerated construction appreciably, the silos, 47 ft. in diameter, with walls 9 in. thick, rising at the rate of approximately 10 ft. every 24 hours.

The five silos rest on a heavy reinforced concrete mat 2 ft. thick supported by concrete piles. For purposes of construction the number was divided into two groups of two and three, the silos in each group being built as a unit. A sixth smaller silo was included with the group of three. The large silos are reinforced with double bands of $\frac{3}{4}$ -in. steel in the lower section and with single bands in the upper section, spaced 6 in. apart.

Movable Forms—The annular forms, built of specially planed $1\frac{1}{2} \times 3\frac{1}{2}$ -in. stock, were 5 ft. deep on the outside of the wall and $4\frac{1}{2}$ ft. deep on the inside. Steel lifting yokes hung by hollow screws seated on vertical reinforcing bars at 7-ft. intervals around the wall supported the forms. Two horizontal ribs, inside and outside, constructed of three laminations of 2-in. plank, were bolted to angle brackets which formed part of the lifting yokes. The inside ribs supported a heavy framing of 8x12 and 10x12 timbers which carried

FIVE LARGE SILOS are built to a height of 85 ft. by the moving form method.

CONCRETE PILES support the reinforced concrete mat which carries five large and one small silo at the edge of the Mystic River, Boston. In the foreground, workmen are erecting movable forms for one of the large silos.



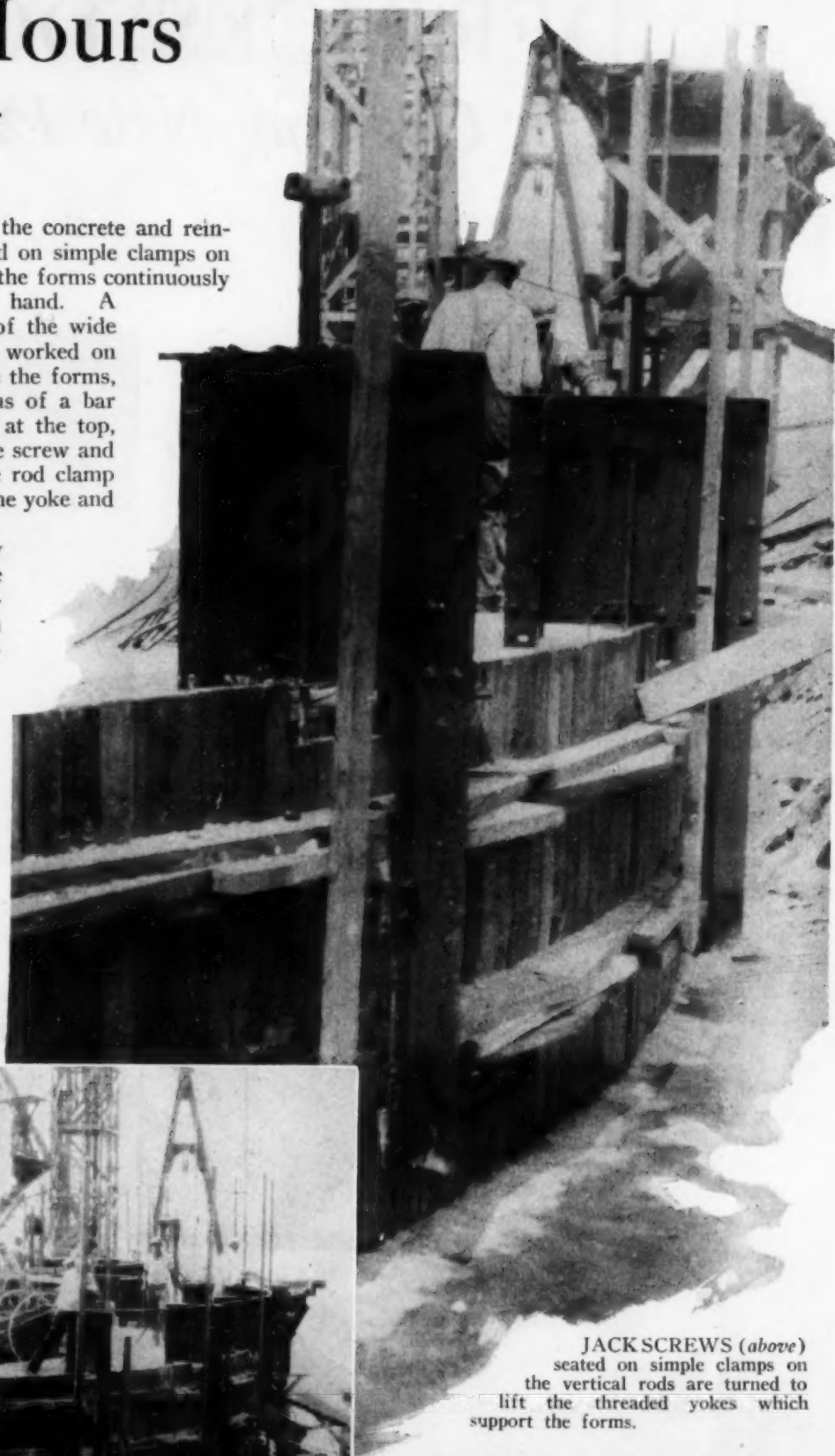
Every 24 Hours

Speed Concrete Placing Gypsum Plant

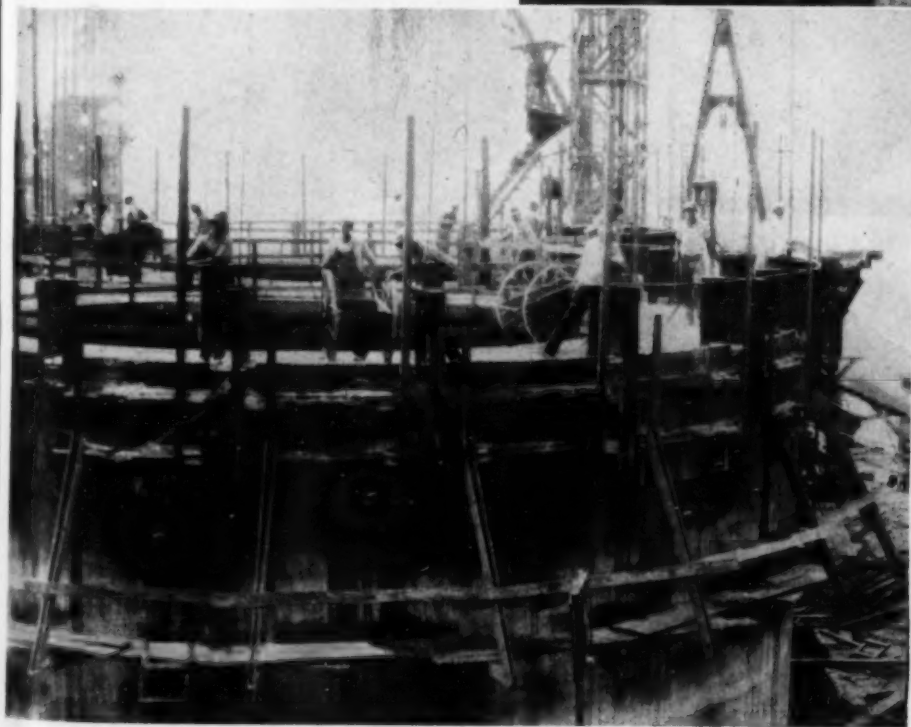
the 7-ft. wide platform used in placing the concrete and reinforcing steel. Hollow screw-jacks seated on simple clamps on the 1-in. vertical reinforcing rods moved the forms continuously upward under repeated turnings by hand. A threaded casting was bolted in the top of the wide web of the lifting yokes. This casting worked on the threads of the jack screw. To move the forms, the workman turned the screw by means of a bar which he inserted in a four-way socket at the top, thus obtaining a little leverage to turn the screw and lift the form. The screw, seated on the rod clamp and turning in the threaded yoke, lifted the yoke and the form which it supported.

Concrete was placed continuously through two 9-hour shifts. During the 3-hour interval between shifts, no concrete was placed, but the jacking went on without interruption. Two men constantly moving around the line of jacks kept the forms rising.

Plant Buildings—The silos are situated on tidewater at the mouth of the Mystic River where they will receive shiploads of raw gypsum from the Canadian mines of the company. Besides the silos, plant construction included several large buildings of brick, steel, and concrete, as well as all appurtenant structures necessary for the manufacture of gypsum products. Because of the great weight of the raw material and manufactured products, 2,800 Simplex concrete piles



JACK SCREWS (above) seated on simple clamps on the vertical rods are turned to lift the threaded yokes which support the forms.



CONSTANTLY MOVING under the operation of two men who work around the line of jacks, the forms rise 10 ft. each day.

driven to a depth of 25 to 30 ft. were placed beneath the structures.

Building of the gypsum plant at Boston marks the entry of a new industry into New England. The Morton C. Tuttle Company managed the construction of the plant. Hayward McCarthy supervised operations for this firm. Sven Johnson, superintendent, was in charge of silo construction for the General Contracting & Engineering Company.

DERRICKS DOMINATE

for Grafting New Dam and Power

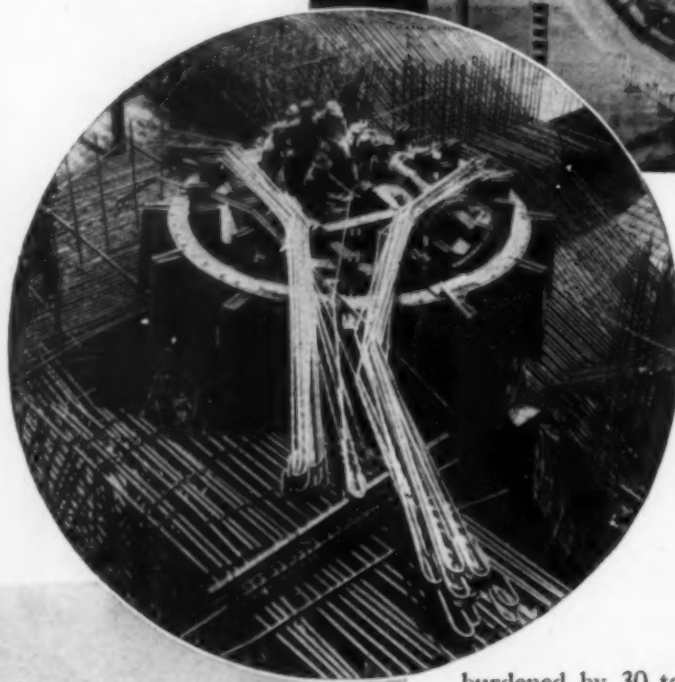
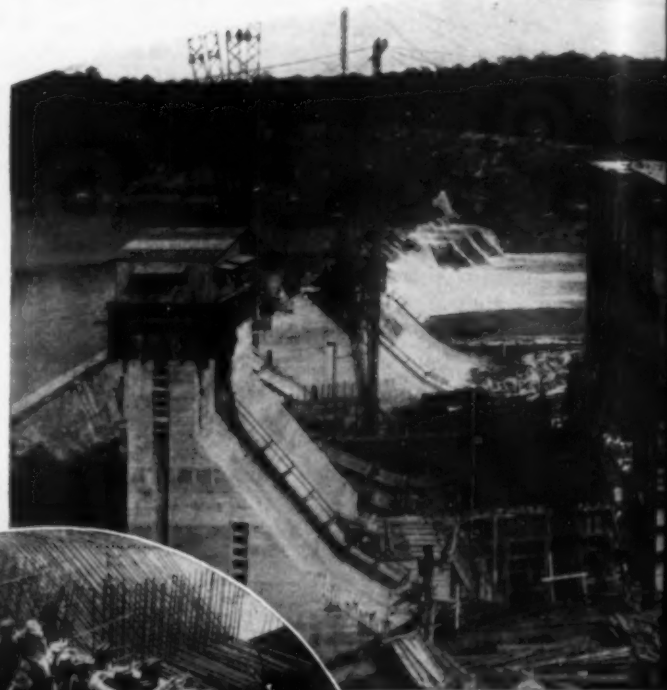
THE work of the Dixie Construction Company in reconstructing an old hydro-electric plant on the Tallapoosa River for the Alabama Power Company included raising the height of an old dam from 36 to 62 ft. and completely demolishing and rebuilding the power plant.

Plans for the job called for the housing and installation of two 25,000-hp. vertical turbines direct connected to 19,000-kva. generators, new head-works with short concrete penstocks, raising the dam and extending the abutments, and constructing 44-kv. and 110-kv. switching stations. Some of the quantities were: concrete, 123,000 cu.yd.; rock excavation, 48,000 cu.yd.; earth excavation, 48,000 cu.yd.; backfill, 30,000 cu.yd.

Choice of Plant—Construction of the power house presented the major problem. It included the excavation and handling of very hard, solid rock from an area 180x100 ft. and 25 ft. deep, the setting of heavy draft tube and scroll case forms, the handling of reinforcing steel, the pouring of concrete, and the erecting of structural steel. It would have been expensive to run tracks into this area to serve a shovel. It was found possible, however, to set derricks in positions to accomplish all of these tasks and, consequently, the derrick method was decided upon.

Another problem was the construction of a cutoff wall extending for a distance of some 300 ft. from the power house into a hill, rock being

DERRICKS (right) perform practically all material-handling operations involved in demolishing the old power house, constructing a new power plant, and raising the height of the dam.



HEAVY REINFORCEMENT (left) is placed around the draft tube forms. Derricks handle both forms and reinforcing steel.



OLD POWER HOUSE and dam before derricks started reconstruction. Height of dam was increased from 36 ft. to 62 ft.

burdened by 30 to 50 ft. of dry clay for most of this length. The cutoff wall was a retaining wall at the power house but changed by transitions to a vertical wall 6 ft. thick and 55 ft. high at the other end. It was not possible for a shovel to work very far into this excavation because of the narrow width. Derricks, again, were the answer. By making two settings they were able to clam out the clay, which was shaken with black powder, and to pile it near by for backfilling, to handle the rock excavation in skips, to place and strip the panel forms, and to pour the concrete.

It was found that the dam itself could be constructed very easily by der-

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PLANT LAYOUT

House to Obsolete Structures

By M. P. ANDERSON
Dixie Construction Co.
Birmingham, Ala.



HEADWORKS(left) of the old power plant are far enough upstream to serve as a cofferdam for the construction of the new headworks. The upstream face of the new dam, however, is on a line with that of the old one.

NEW PLANT (right), as rebuilt in one year. This plant houses two 19,000-kva. turbine-generator units.



ricks. Practically no excavation was necessary in the river bed as the rock was bare and sound. The company, therefore, fitted the whole job with 10-ton, 100-ft. boom, guy derricks.

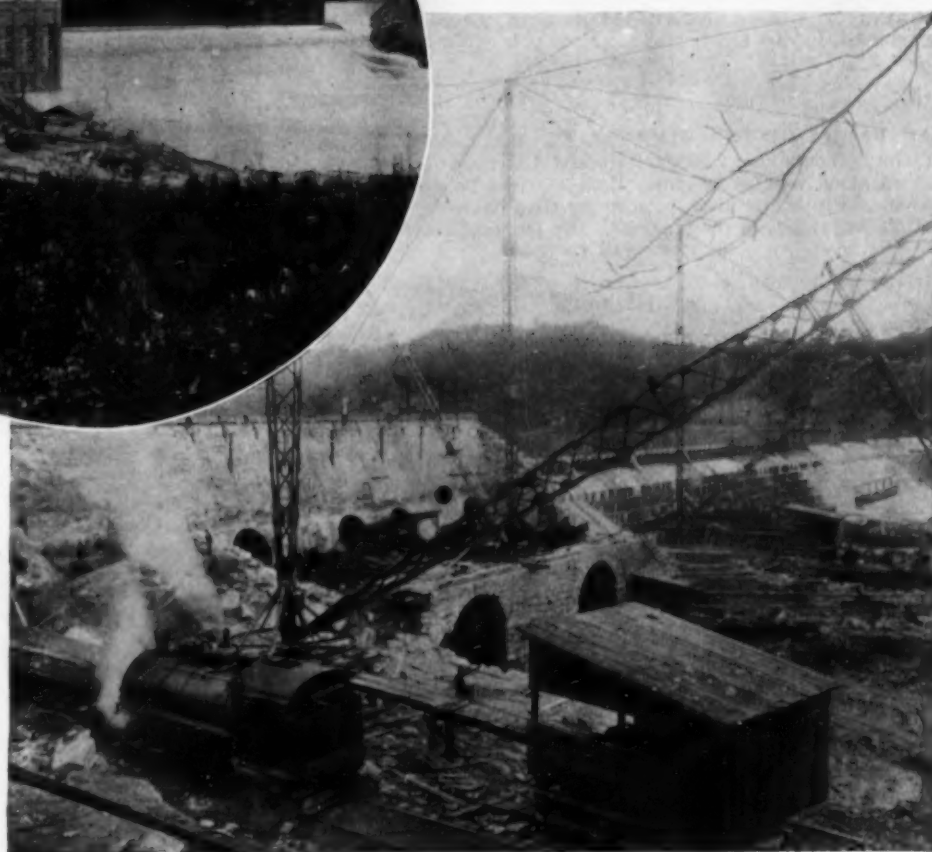
Concrete was handled in 2-cu.yd. bottom-dump buckets transported on flat cars from a central mixing plant.

River Control—The upstream face of the new dam is in line with that face of the old one, but the new headworks were placed far enough downstream to enable the old headworks to be used as a cofferdam. Five-foot flashboards on the crest of the old dam facilitated the diversion of the river during the various stages.

A major factor in scheduling of the

work was the existence of an immense storage dam some 12 miles above the dam in question. This upper reservoir is filled during the winter and spring and the stored water is used for generating purposes during summer and fall. Floods would be expected to occur as a result of the combination of a full reservoir and heavy rainfall. As the reservoir completes filling normally about June of each year, it was decided to schedule work requiring stream diversion at times other than June. Accordingly, the power house work, which would consume the most time for construction and which restricted the river flow very little, was begun about May, 1927. About November, when the reservoir upstream was partly down, the spillway work was begun and brought to completion by April of the next year only a week ahead of a disastrous flood. The reservoir had filled by this time contrary to expectations and additional rains wrought their full effect.

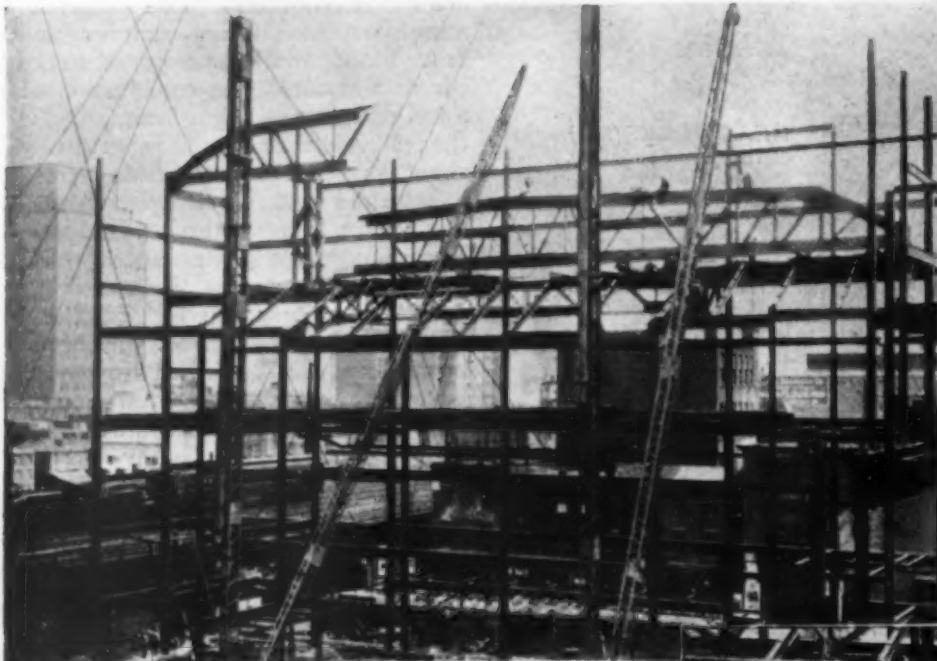
The old power house was shut down in May, and one year later the first new unit was put on the line.



DEMOLISHING old power house. New power house substructure in part covers this substructure.

MASSIVE BALCONY FRAME

*takes one-third of 1,800 tons of steel
used in Philadelphia theater*

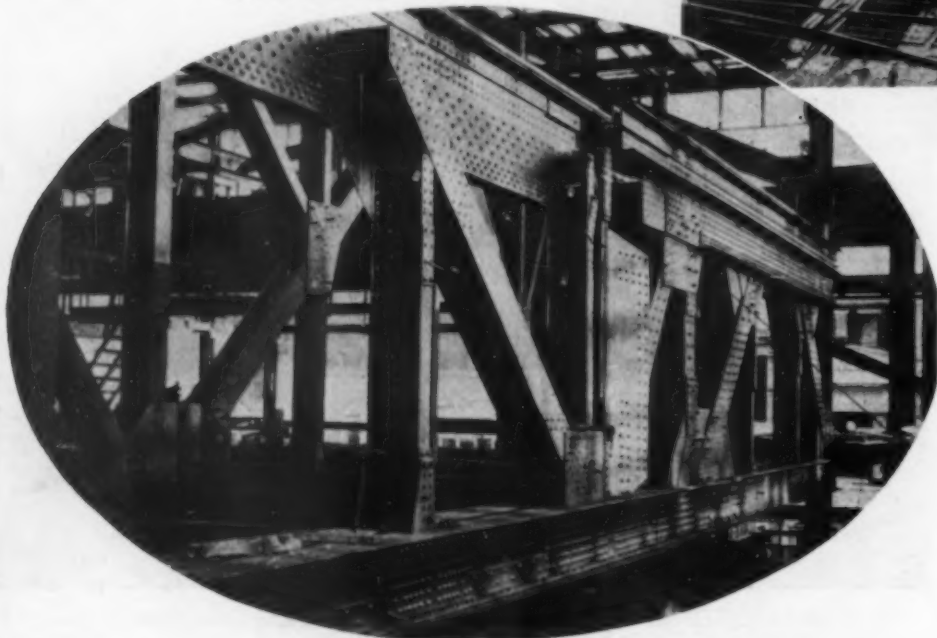


HEAVIEST ROOF TRUSS, weighing 30 tons, was erected by shoring up in three sections from upper balcony framing. Seven other roof trusses, 138 ft. long, were placed, completely assembled, by the tall derricks. Note pole stiffeners lashed to the masts.

ASSEMBLING HEAVIER MAIN BALCONY TRUSS (below), containing 25,000 rivets and 173 tons of steel. Top chord alone weighs 80 tons. Both top and bottom chord are double. Projecting plate, with empty rivet holes, at right center of photograph, is to receive one of two diagonal trusses running to main wall columns.



DIAGONAL TRUSSES between wall columns and forward main balcony truss carry the fulcrum truss, reducing its length from 131 to 83 ft.

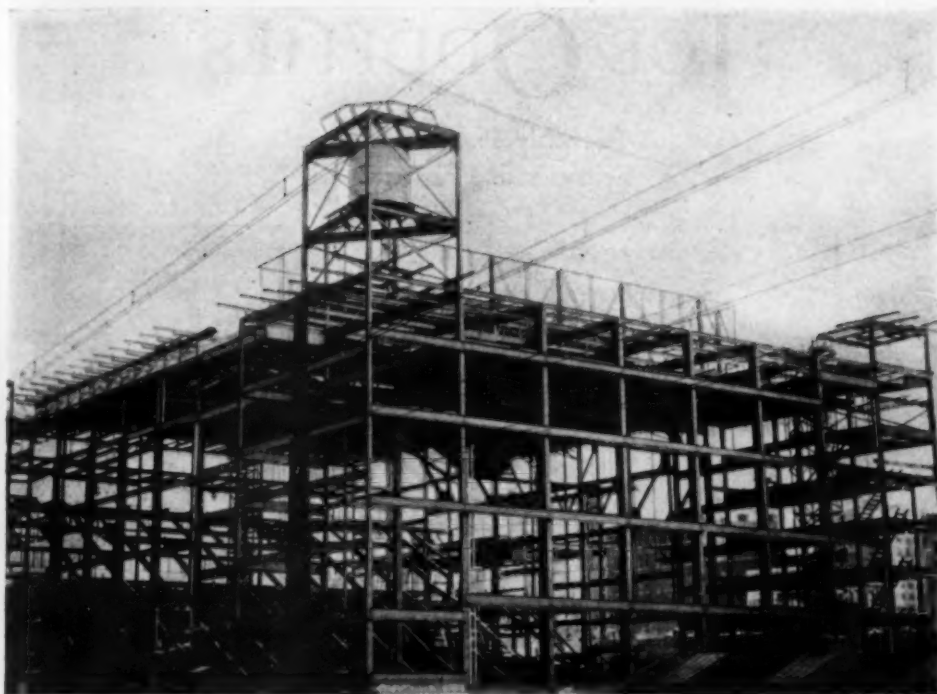


greater strength in the chords. The forward truss, meeting these requirements, weighs 173 tons.

To support the fulcrum truss and to cut down its length from 131 ft. to 83 ft., two diagonal girders connecting with wall columns were introduced in the design. The fulcrum truss, of 35 tons weight, was brought to the job fully assembled. Ten trusses cantilevered over the fulcrum truss and tied back to the heavier of the main balcony trusses support the extreme front portion of the balcony.

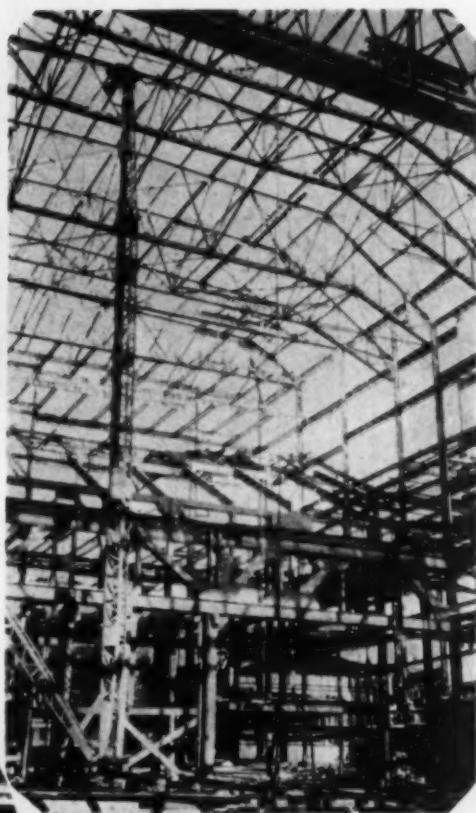
Eight roof trusses of 138-ft. span

March, 1929—CONSTRUCTION METHODS

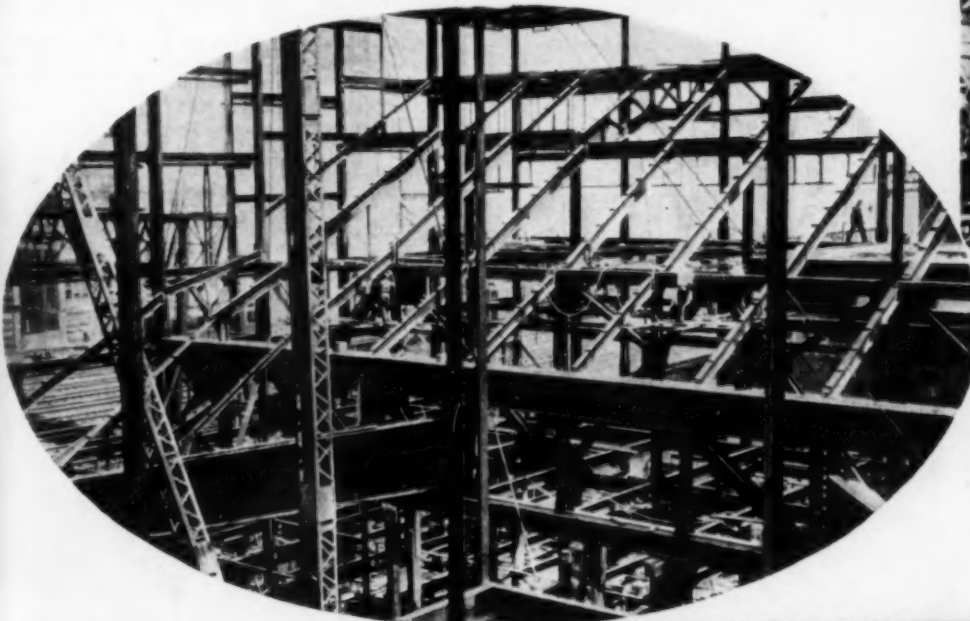


COMPLETE FRAMEWORK, 1,800 tons of steel. On nearest corner are platforms for the house tank and the sprinkler tank. House tank is in place. Pent house framing for dressing room elevators at far right corner. At far left corner is the pent house for elevators to the promenades and balconies.

Photos and data from
MILTON TUCKER
Hoffman-Henon Co.,
Philadelphia, Pa.



ERECTING HEAVIER MAIN BALCONY TRUSS (*above*) 15 ft. deep and 131 ft. long. The 138-ft. roof trusses, with top chords 113 ft. above the auditorium floor, were assembled before erection.

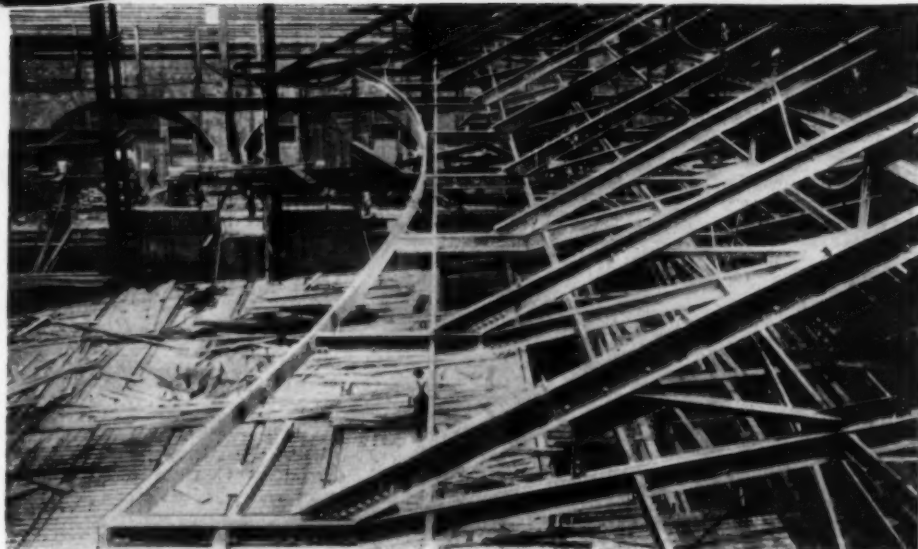


TWO DIAGONAL TRUSSES, framing into the forward main balcony truss, ready to receive the fulcrum truss. Behind the forward truss is the second main balcony truss, 23 ft. high, weighing 65 tons.

carry the 3½-in. gypsum roof slab. The roof truss at the rear of the theater is 13 ft. deep. As this truss supports the projection and broadcasting rooms hung beneath, it is the heaviest.

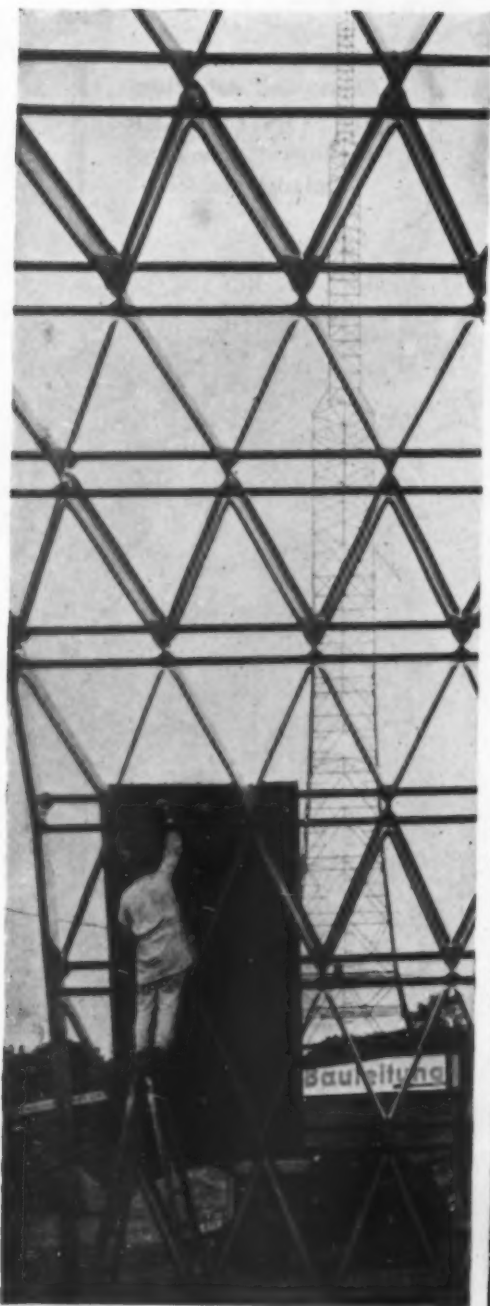
The Hoffman-Henon Company, Philadelphia, was architect and engineer for the building. Roland Toner superintended construction for this firm. S. A. Lindstrom, Fernwood, Pa., erected the steel, which was fabricated by the Belmont Iron Works, Philadelphia.

TEN TRUSSES (*below*) cantilevered over the fulcrum truss and anchored back into the forward main balcony truss, carry the extreme front portion of the balcony.



JOB ODDITIES

A Monthly Page of Unusual
Features of Construction



©Wide World

METAL WEB truss manufactured by Professor Hugo Junkers, German airplane designer, needs no column supports for structures 65 ft. high and 195 ft. wide.



WOOD AND CANVAS model of stone foot bridge for St. Paul's School, Concord, N. H., helped trustees decide on texture of masonry work and carried pedestrians while stone bridge was under construction. Connolly Brothers, Beverly Farms, Mass., as contractors, built both bridge and model.

Photo from
J. W. Cleveland
Superintendent
Connolly Bros.,
Beverly Farms
Mass.



AND THE FARMER hauled another load away when one of the three Universal cranes used by Edward H. Jacob, mushroom-grower of West Chester, Pa., had finished clam-forking this truck load of manure from a railroad car.



©P.A.

LOG WATER PIPE (left) unearthed in Chicago is lined with copper sheeting rolled into a tube and is reinforced with iron bands. This pipe line of drilled logs once served to supply a portion of the city with water.



A QUICK LAUNCHING for racing craft when a P&H crane of G. O. Reed, Inc., Miami Beach, Fla., handles them.



DRAINAGE SYSTEM now collects ground water which caused slide. Each of two outlet pipes discharged 16,000 gal. daily during Dec., 1927.

ADEQUATE DRAINAGE *Cures Slides*

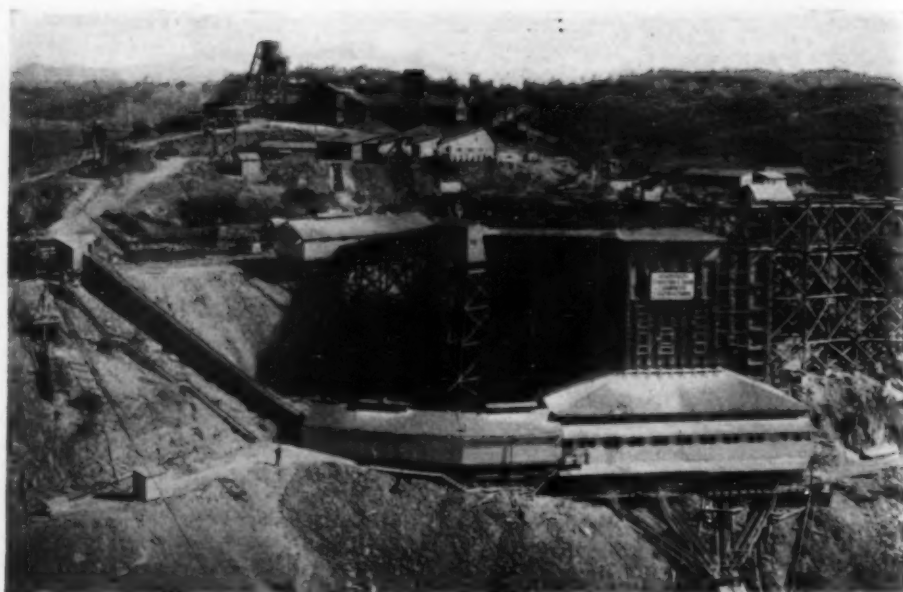
TO REMEDY the poor drainage condition causing serious slides on a heavy road grading job performed by Booth & Flinn, Ltd., for the Allegheny County Department of Public Works along the steep hillsides south of the Ohio River near Pittsburgh, Pa., the contractor excavated trenches to a depth beneath the thin white clay vein which formed the plane of slip and laid perforated 12-in. corrugated metal pipe covered with 2x4-in. and 4x6-in. broken slag to collect and lead away the ground water responsible for lubricating the impervious white clay layer. In the slide illustrated, 5,000 cu.yd. of fill went down on the railroad tracks below. The drainage system originally installed failed to provide adequately for the collection of ground water on the upper side of the grade. Resultant lubrication of the clay vein caused the slide. The remedy described then was applied. A drain carries water collected on the upper side of the road to the lower side where the pipe divides into two branches. The fill has not moved since this drainage system was installed.

PERFORATED PIPE (right) is laid in a trench and covered with broken slag.



TRENCH is excavated to a depth below the thin layer of impervious clay which slopes in same direction as the surface of the ground. By intercepting the ground water, trenches prevent seeping over clay layer.

MIXING AND PLACING



MIXING PLANT contains four 2-yd. mixers, chutes from which converge in 8-yd. control hopper on hillside below. Aerial tramway discharges into bins.

65,000 Cu. Yd. of Concrete Per Month

FROM the day in September, 1925, when Lynn S. Atkinson as low bidder signed the contract to build a variable-radius arch dam in the canyon of the Mokelumne River for the East Bay Municipal Utility District, comprising Oakland, Berkeley, and seven other allied California communities, his problem has been to produce and place concrete on a quantity basis which would net a profit in spite of low unit prices. Associating with himself William A. Kettlewell and Guy F. Atkinson to form a co-

partnership under the name of Atkinson Construction Company, the three men attacked the problem of laying out a plant which would maintain the most profitable production schedule on the Pardee dam.

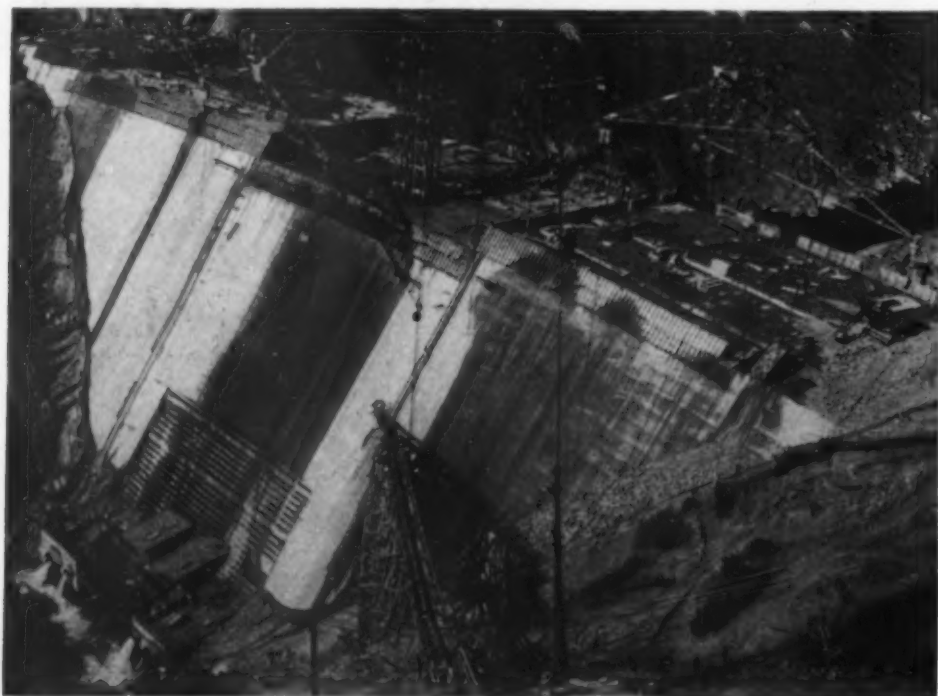
Litigation delayed the start of construction until August, 1927. By this time further tunnel investigation of foundation conditions had shown that a curved gravity type dam was more economically adapted than the arch type to tying in with the canyon rock formation, a greenstone schist with

numerous surface joints and seams. The design selected calls for 615,000 cu.yd. of concrete in a dam with a crest length of 1,220 ft. and a maximum height of 360 ft.

Character of Plant—A time limit of 3½ years is set by the contract. In line with the usual Atkinson policy, the contractor intends to clear a profit by completing the dam in the considerably shorter period of 2 years, using the least number of man-hours possible. To this end, the three partners determined upon the largest and most efficient layout of mechanical equipment which could be fitted economically into the surrounding conditions, the duration of the work being considered. The equipment cost totals about \$1,250,000 for this \$6,000,000 to \$7,000,000 dam.

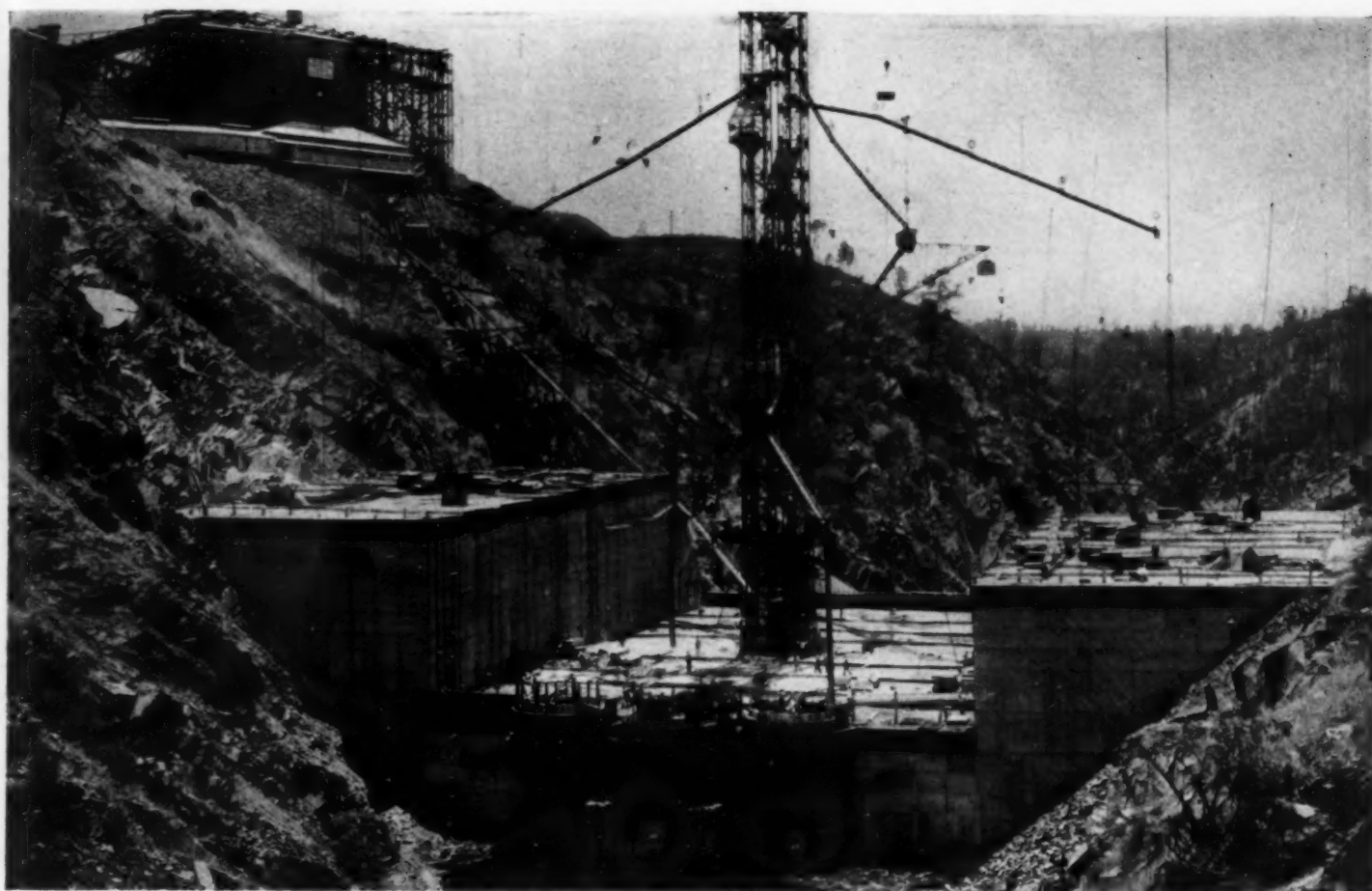
Spoil banks left by gold dredges 4 miles below the dam site offered the best source of aggregates. A problem of economical transportation was involved in the selection of a means to carry the aggregates to the mixing plant. Of the three possibilities, a 4-mile railroad with heavy excavation, an 8-mile railroad with light excavation, and an 18,700-ft. aerial tramway, the contractor chose the last.

A 4-yd. Monighan and a P & H dragline load 20-yd. Western air-dump cars at the gravel piles. The cars are pulled by 25-ton Plymouth locomotives to the gravel plant where they dump their loads into a track hopper discharging through reciprocating feeders on to a 42-in. rubber belt which elevates the material to the washing plant. Screen washers, 60 in. in diameter and



STEPS on downstream face of dam indicate location of power house. A 10-ton high-line cableway placed the four sluice pipes and two penstocks. Concrete chute passes through dam to base of tower.

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CONCRETE is placed in blocks between keyed contraction joints located on radial lines. Panel forms, 5 ft. high and 6 ft. long, provide for pouring in 5 ft. lifts.

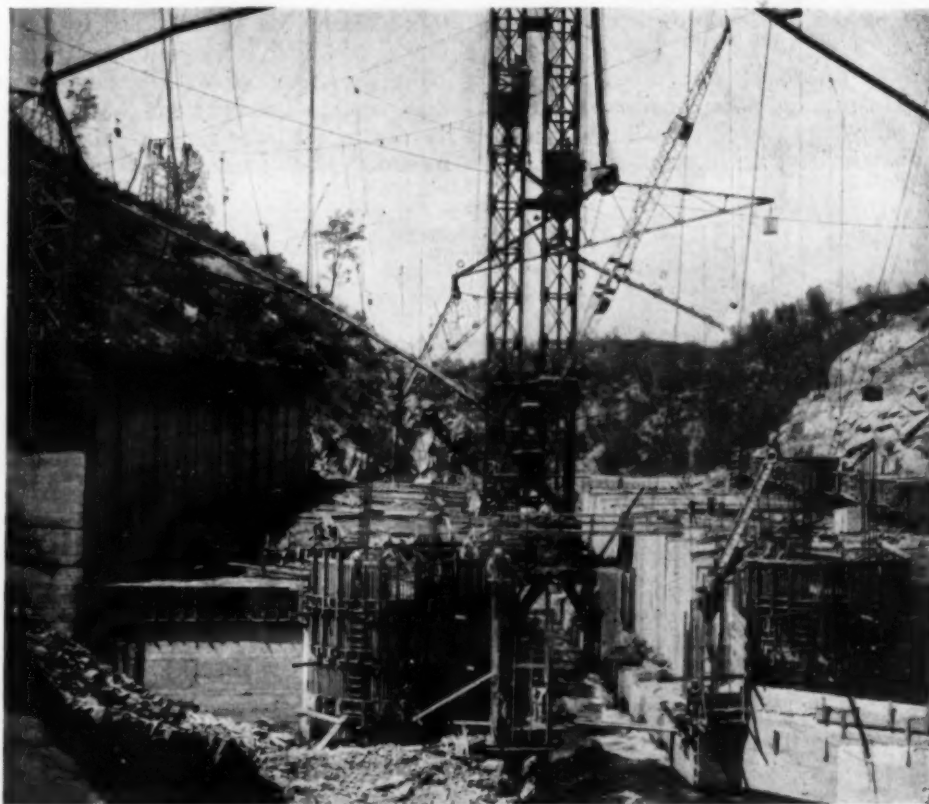
21 ft. long, and banks of four conical screens clean the gravel and separate it into three sizes: sand (0 to $\frac{3}{8}$ in.), gravel ($\frac{3}{8}$ to $1\frac{1}{4}$ in.) and cobbles ($1\frac{1}{4}$ in. to 6 in.). The sizes are stocked in separate piles storing 15,000 cu.yd. A 30-in. belt beneath the stockpiles carries the material to the loading terminal of the tramway. The gravel plant's maximum capacity is 2,000 cu.yd. of pit-run material in 8 hours; its average production is 1,500 cu.yd. The Bodinson Manufacturing Company, San Francisco, designed and provided the plant.

Aerial Tramway—A Bleichert aerial tramway, designed and installed by the American Steel & Wire Company, carries the material from loading terminal to mixing plant. This tramway uses a lock-coil track cable of $1\frac{5}{8}$ - to $1\frac{3}{4}$ -in. diameter on the loaded side and 1- to $1\frac{1}{4}$ -in. diameter on the empty side. The 18,700-ft. tramway is divided into two approximately equal sections with a transfer terminal between sections.

Wooden towers support the track cable on steel hangers at 40 points along the line. Buckets, 208 in number, each with a capacity of 30.2 cu.ft., are spaced at intervals of 192 ft. The traction cables, driven by grip drive wheels on each section at the rate of 470 ft. a minute, pull a bucket into the terminal every 24 seconds.

When concrete delivery to the dam reached its maximum of more than 65,000 cu.yd. per month during August

and September, 1928, the tramway proved to be the limiting factor in production. During a 79-day period in

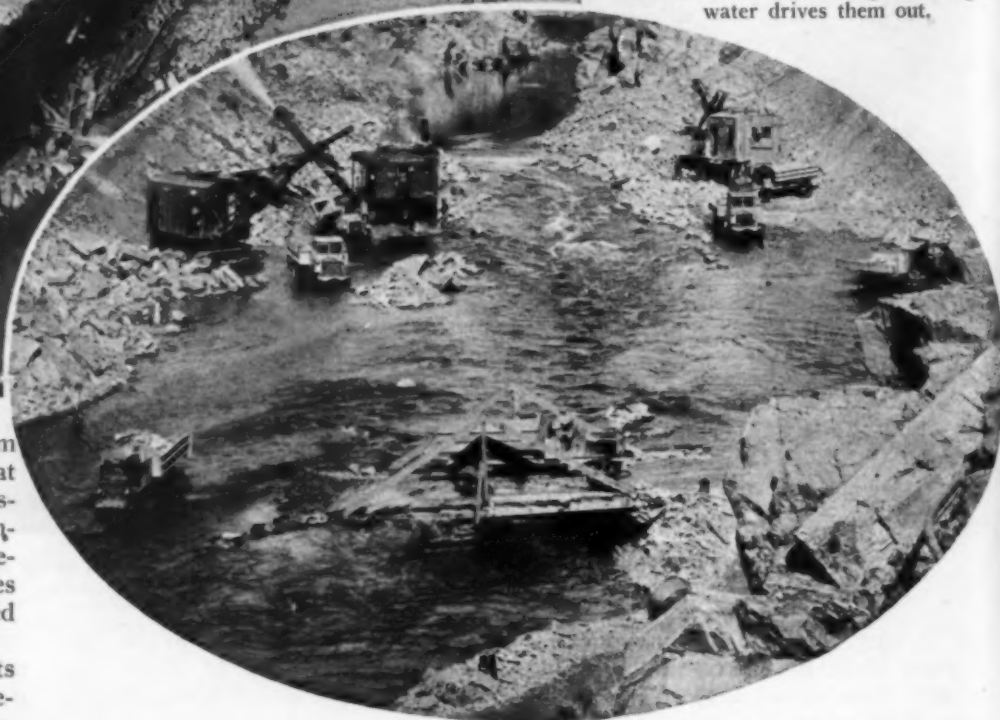


OPENING 21 ft. wide and 15 ft. below the level of the washout pipes passes the water until the permanent sluice pipes are installed. Trash racks for permanent pipes in place on both sides of the temporary sluiceway.



DIVERSION FLUME (left), 30 ft. wide by 16 ft. high and 510 ft. long, with a capacity of 10,000 sec.-ft., bypassed the river and made it possible to excavate and pour the foundation during the high water of the winter months, 1927-28. A 30,000-sec.-ft. flood swept out the flume and the cofferdam at its upstream end on March 25, but the diversion scheme gained 6 months for the contractor, nevertheless.

EARLY FOUNDATION EXCAVATION (below), October, 1927. After rain storm, shovels and trucks continue working until high water drives them out.



which the tramway was free from hampering conditions, it operated at 84.4 per cent efficiency. Cost of transporting gravel the 3.54 miles by tramway, including labor, power, maintenance and repairs, and capital charges to retire the investment, is estimated at 35.4c. per yard or 26c. per ton.

Mixing Plant—Tramway buckets drop the three sizes of washed aggregate into separate bunkers at the mixing plant. Each of the bunkers is 80 ft. long by 13 ft. wide by 47 ft. deep to top of discharge tunnels.

The mixing plant contains four electrically-driven Smith 2-yd. tilting mixers, which actually turn out 9 cu.ft.

more than the rated capacity per batch. Four discharge tunnels running crosswise under the aggregate bins contain batchers and 65-ft. conveyors to feed the hoppers above the mixers. Each tunnel taps three bins.

Discharge chutes from the four tilting mixers converge in an 8-yd. control hopper on the hillside below the plant. A manually operated radial gate regulates the flow from this point through a 20-in. wide chute descending on a 40 per cent grade to the base of a Lakewood double-compartment steel tower, up which the concrete is hoisted in 2-yd. skip buckets. To assist in placing the concrete for the upper portion of the dam two supplementary single-compartment Insley steel towers have been placed symmetrically on the two sides of the gorge. All stationary power units of the construction plant are electrical, a total of 1,200 hp. in General Electric motors being used.

Personnel—For the East Bay Municipal Utility District those in charge of the Pardee Dam are Arthur P. Davis, general manager and chief engineer, F. W. Hanna, chief designing engineer, and James Munn, chief construction engineer. Stationed at the dam are C. E. Grunsky, Jr., division engineer, and E. L. McDonald, resident engineer, for the district. E. M. Whipple is superintendent, and Henry Taber, engineer, for the Atkinson Construction Company.



LOADING TERMINAL of what is called the longest and largest heavy-duty aerial tramway ever built. It handles 220 tons of material per hour continuously.

Present and Accounted For -

A Page of Personalities

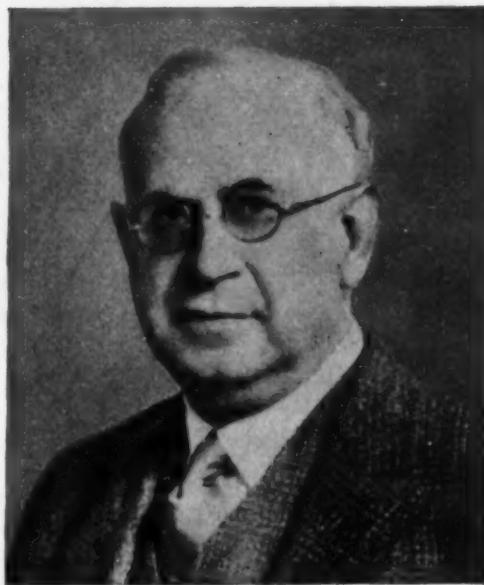
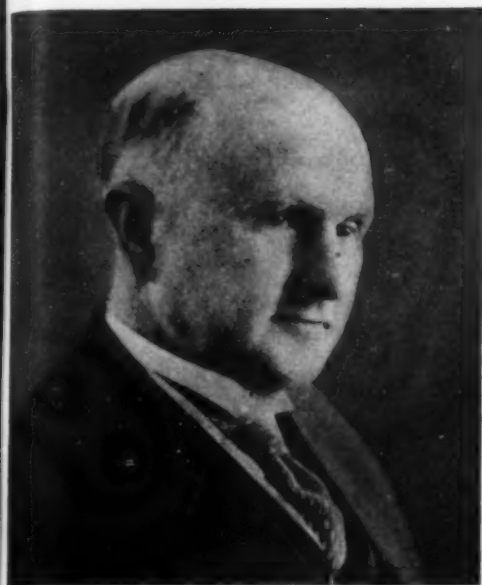
In Charge of Boulder Dam

TWO MEN will, from now on, have almost complete control of the design and construction of Boulder Dam in the Black Canyon of the Colorado River.

DR. ELWOOD MEAD (*left*), commissioner, Bureau of Reclamation, Department of the Interior, Washington D. C., is ultimately responsible for the conduct of the work. He has placed the project under the direct supervision of

RAYMOND F. WALTER (*right*), chief engineer, Bureau of Reclamation, Wilda Building, Denver, Colo., who will double his staff of 60 engineers to design, and supervise construction of, the great project.

©Keystone



CRAFTSMANSHIP CERTIFICATES WERE PRESENTED to mechanics who earned the award on the building of the Bank of New York and Trust Company, New York City, constructed by Marc Eidlitz & Son, Inc. William O. Ludlow, vice-president of the New York Building Congress, is making the presentation. Workmen who received certificates at this

ceremony were Theodore Fay, electrician; Charles Gorman, metal lather; John Murphy, marble polisher; Leo Schaezel, marble setter; Gustav Lutz, marble setter's helper; Charles Endres, ornamental iron and bronze worker; Michael Giacalone, painter and decorator; Edward Herdman, plasterer; J. Bloodgood, rigger and machinery mover; Mian Ugolino, terrazzo worker; Ermenegildo Marcus, terrazzo worker's helper; John Englebrecht, tile setter; William McDonauld, tile setter's helper.



ANSON MARSTON, engineering dean and director of Iowa State College, Ames, Ia., is the new president of the American Society of Civil Engineers.



CHARLES N. FITTS, New England Structural Company, Boston, has been elected president of the American Institute of Steel Construction.

Step-by-Step *Flat* Roofing a Building *With*



1 TILES are hoisted to the roof. A small portable hoist provides the power.



2 HAND TRUCKS, crossing from monitor to monitor on bridges, deliver tile to laying gang.



3 TILE SETTERS place the flat concrete panels on the I-beam purlins. The purlins usually are spaced 5 ft. apart for flat tiles, but special tiles are made to fit any span. As made by the American Cement Tile Manufacturing Company, a standard flat tile measures 24x60x1½ in. and weighs 170 lb.



4 TO FIT A TILE for special use, (left) an electric emery wheel makes two cuts on each side. The tile then is broken.



5 CHIPPING with a hatchet (above) smooths the center of the break.

Field Methods With Cement Tile



6 FLASHING TILE are made to cover the gap between the roof and the window sash in the monitors.



7 TO MAKE THE ROOF WATERTIGHT the joints are pointed with a special plastic asbestos roofing cement.



8 THREE PLIES (*above*) of standard composition roofing provide a water-proof covering.



9 RIDGE TILE (*right*) are laid along the edge of the monitor after the roofing has been applied. The joints are pointed.

NEW EQUIPMENT ON THE JOB

Light, Revolving Shovel

The Bay City Dredge Works, Bay City, Mich., builds a full-revolving, light half-yard ($\frac{1}{2}$ -yd. with bucket level full) shovel convertible to clamshell,



skimmer, trench hoe, dragline, and backfiller. Shovel boom is 17 ft. long; crane boom, 30 ft. The machine, weighing 13 tons, with crawler mounting and 35-hp., 4-cylinder gasoline engine, has a tail swing of only 7 ft.

Small Ditcher

The new Topping Pony Ditcher of the Industrial Brownhoist Corporation,



Cleveland, digs trenches 13 to 30 in. wide to a maximum depth of $7\frac{1}{2}$ ft. Standard tractor engine has nine forward and three reverse speeds.

Agitator Truck Body

A simple light-weight body, made in 1- to 3-yd. sizes, mounted on any truck

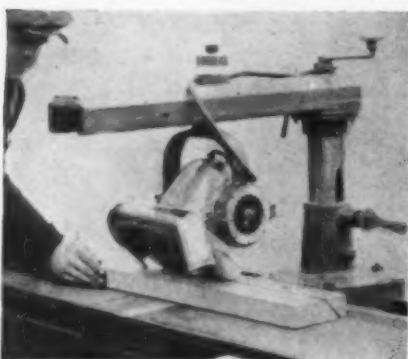


chassis and fitted, by removing the paddles, for hauling other bulk mate-

rials besides concrete, has been designed by the Blaw-Knox Company, Pittsburgh, to prevent segregation of wet or dry mixes during transit periods up to 3 hours.

Electric Woodworker

The DeWalt Products Corporation, Leola, Pa., announces the DeWalt Junior, smaller model of the DeWalt Wonder-Worker. This electric wood-



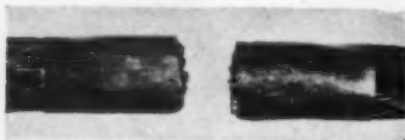
worker on 29x59-in. wooden table weighs 235 lb. and performs 29 district cutting operations. Equipment includes a 12-in. combination cross-cut and rip saw. Motor operates on d.c. or any cycle a.c.

Binds and Cuts Cable

The Morse-Starret Products Company, San Francisco, makes a device



by which one man binds a cable in a thin sheet of tough, pliable steel and cuts any size up to 1 in. in less than a minute, leaving ideal seizings of true



shape and lay on the two sections. The 1-in. cutter weighs 8 lb.; a larger size for $1\frac{1}{2}$ -in. cable weighs 20 lb.

Trailer Tool Box

The trailer tool box of the Mohawk Asphalt Heater Company, Schenectady, N. Y., has a tool compartment 7x3 ft. by 2 ft. high in a body of 10-



12- and 14-gage steel, reinforced with angle iron and mounted on half elliptic springs over a 2-in. axle. Adjustable supporting leg is rigidly connected to channel frame.

New Clamshell Bucket

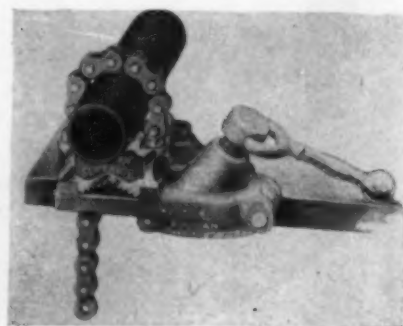
Clamshell buckets for digging and material handling, of $\frac{1}{2}$ - to 2-yd. size, weighing from 2,350 to 5,800 lb., with wide spread of jaws and concentration



of closing power at the end of the stroke, are announced by the Lakewood Engineering Company, Cleveland, Ohio.

Chain Pipe Vise

The handle on top, where it is easily operated, and reversible jaws, for longer life, are two features of the Vulcan Superior pipe vise which J. H.



Williams & Company, Buffalo, N. Y., have introduced. The vise is made in two sizes for $\frac{1}{2}$ - to $4\frac{1}{2}$ -in. pipe.

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THE *New* LORAIN 55 is Ready to go!

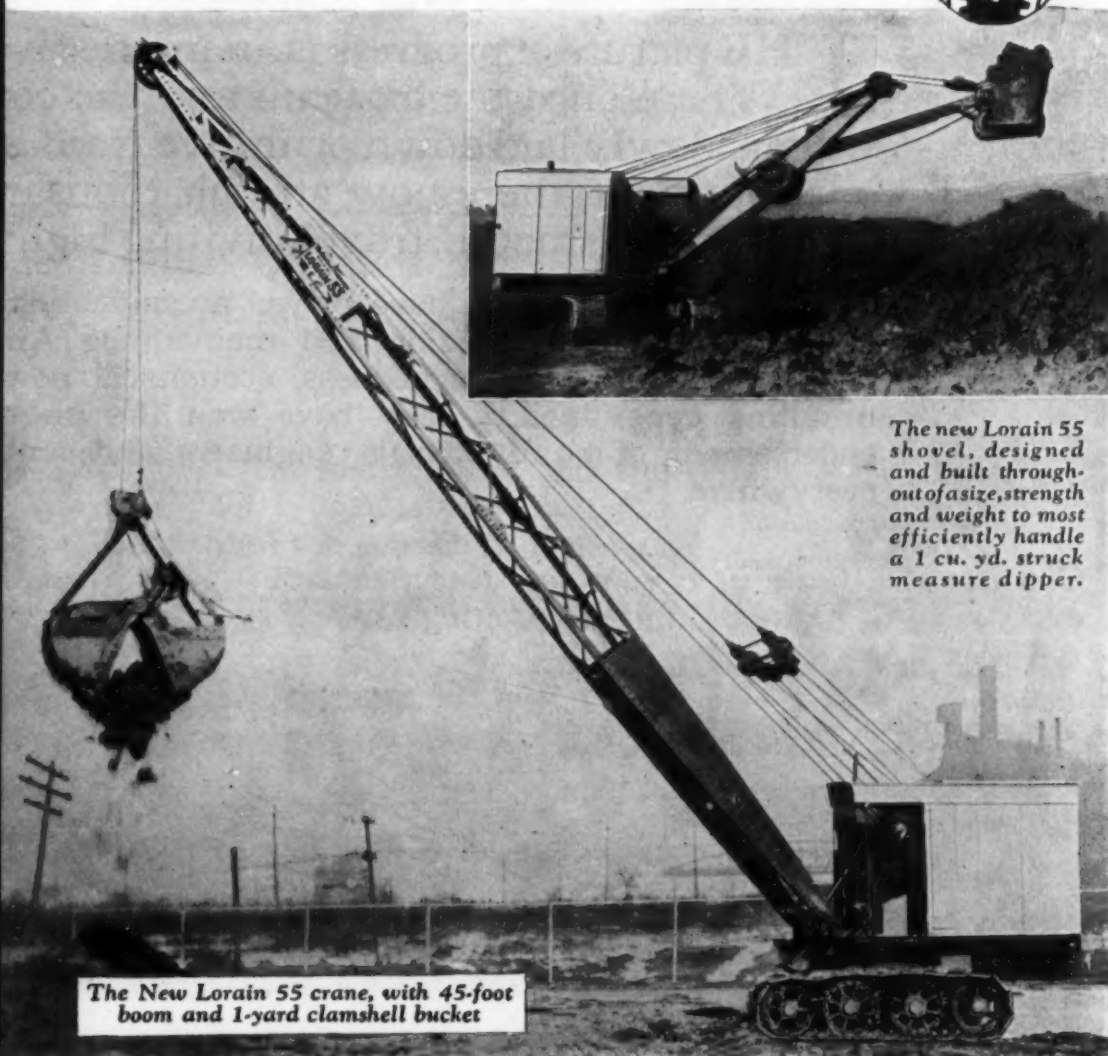
A REAL 1-YARD MACHINE, designed and built as such—that is the new Lorain 55, a crane—clamshell—shovel or dragline.

It isn't "cut-down" nor "built-up" from other capacities, but is especially constructed to handle most efficiently the job of a 1-yard machine.

Like its bigger brother, the Lorain 75, the new Lorain 55 has all the advantages of the Thew Center Drive principle—unequalled ranges, tremendous direct power, rugged strength, high speeds, smooth, positive three lever control, and 2-speed center drive truck.

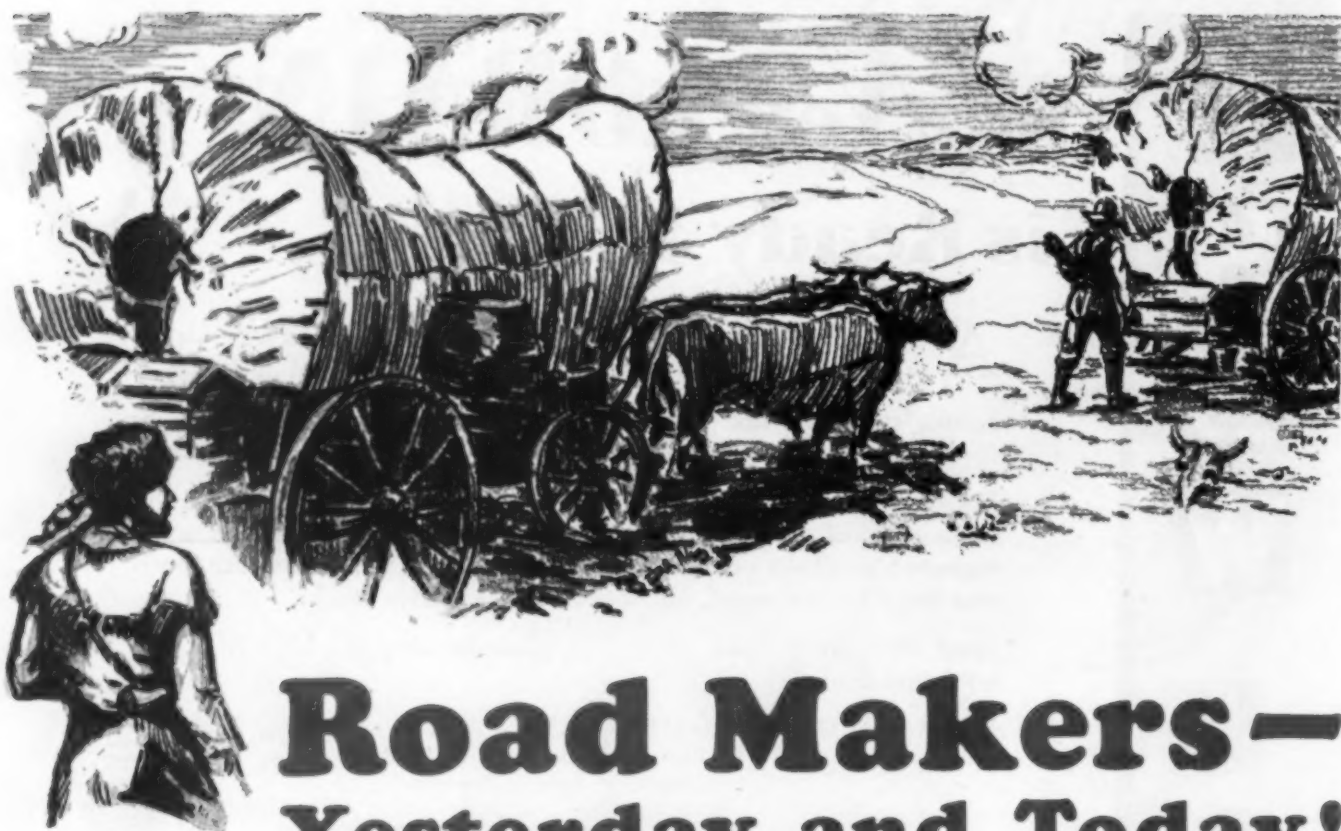
And like the Lorain 75, it is a profit-earning machine from the very first load.

THE THEW SHOVEL COMPANY • Lorain, Ohio
CRANES • DRAGLINES • SHOVELS
Gasoline or Electric Powered



The new Lorain 55 shovel, designed and built throughout of size, strength and weight to most efficiently handle a 1 cu. yd. struck measure dipper.

The New Lorain 55 crane, with 45-foot boom and 1-yard clamshell bucket



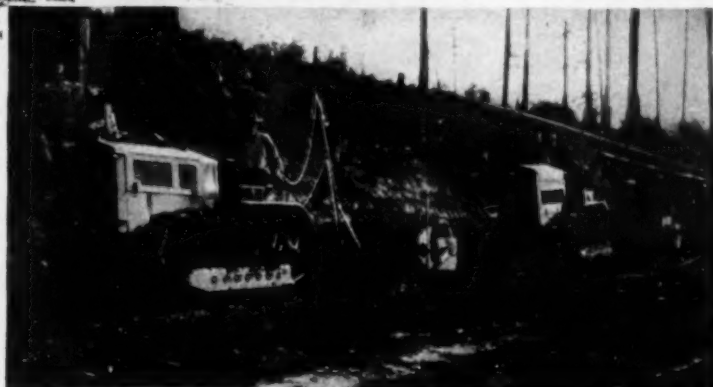
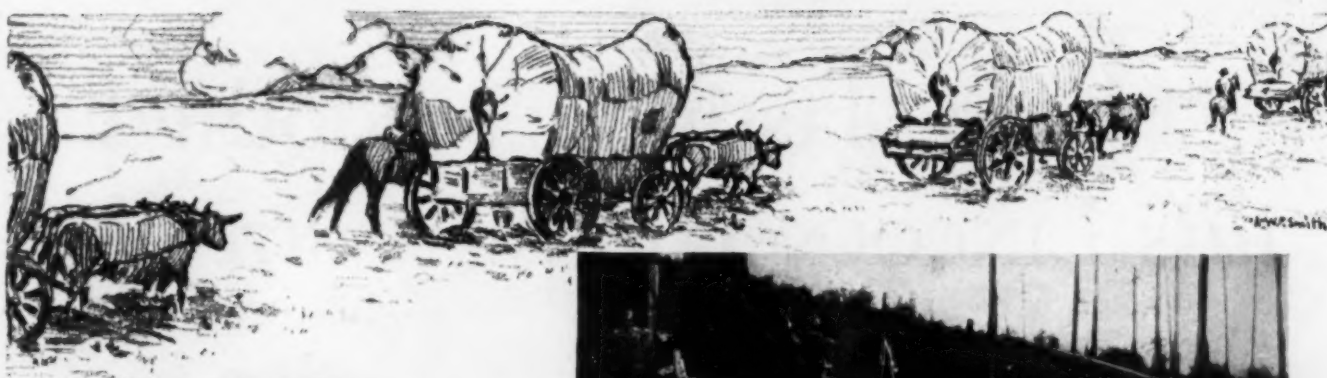
Road Makers— Yesterday and Today!

THE picture of progress is an impressive one. Where once the ox-team and the covered wagon slowly laid down primitive trails across our continent, there now stretch thousands of miles of wide, smooth, travel-inviting highways.

Cletrac Crawler Tractors have played an outstanding part in this work of modernizing and maintaining America's roads. Through their ruggedness, economical power and unfailing dependability they have won the unqualified endorsement of road officials, engineers and contractors everywhere.

Cletracs are built in a complete line to meet every need of highway and contracting service.



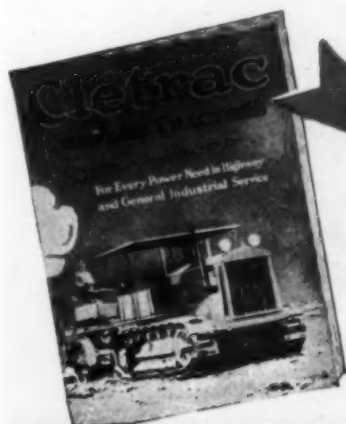


WHY not find out—today—how Cletracs speed up work, improve methods and cut operating costs? These powerful crawler tractors are saving time and money *daily* for thousands of owners in every phase of road and contracting service. They are constantly establishing performance records of vital importance to every user of tractor power.

Cletrac power is *dependable power*—in any weather and on any job. Cletracs are versatile, speedy, sure-traveling units that are equally at home on highway work, on reclamation projects, on leveling, grading, earth-moving and all similar operations.

The new 32-page Cletrac picture book tells the Cletrac story, *completely*, regarding your type of work. Let us send it to you without cost or obligation. Mail the coupon or a postal.

THE CLEVELAND TRACTOR CO.
19323 Euclid Ave. CLEVELAND, OHIO



**Fill out
 and mail
 this coupon
 TODAY!**

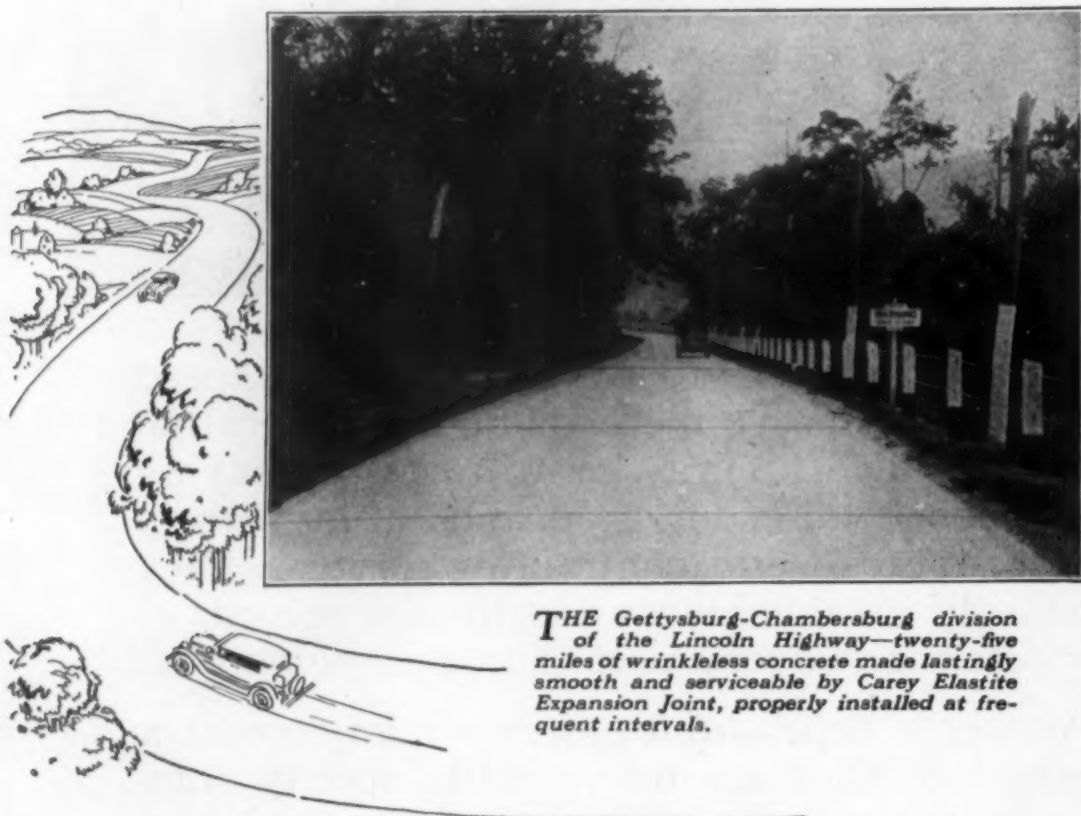
THE CLEVELAND TRACTOR CO.
 19323 Euclid Ave., Cleveland, Ohio

Please send your new Cletrac book to

Name _____

Address _____

Long-lastingly smoothed! this LINCOLN HIGHWAY stretch



THE Gettysburg-Chambersburg division of the Lincoln Highway—twenty-five miles of wrinkleless concrete made lastingly smooth and serviceable by Carey Elastite Expansion Joint, properly installed at frequent intervals.

TWENTY-FIVE miles of wrinkle - proofed concrete, without a hump or a hollow—the stretch of Lincoln Highway between Gettysburg and Chambersburg, Pennsylvania. The delight of motorists, the safeguard of the road-builders' reputation. The Carey kind of a concrete road! Smoothed—long-lastingly smoothed—with Carey Elastite Expansion Joint.

Carey Elastite Expansion Joint is made of the best and most carefully selected materials—fibrous

asphalt, permanently pressured between two layers of asphalt-saturated felt. It meets any expansion joint specifications, anywhere, and it lasts as long as the concrete it protects. More of an economy now than ever before. Write for particulars about modern methods of expansion joint installation.

Carey Elastite
EXPANSION JOINT

THE PHILIP CAREY COMPANY • Lockland, CINCINNATI, OHIO

"MOST MILES FOR YOUR ROAD DOLLARS"



Building for tomorrow

*... and the demands of the
years to come*

Forward mindedness—to build into the machines of today the ability to meet the demands of tomorrow—such must be the credo of the manufacturer who would have his road building equipment serve the "high-way thinking" of the future.

Austin-Western Road Machinery goes beyond demand—setting new

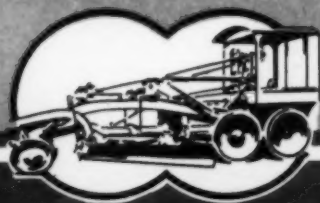
standards of performance. These, in turn, make possible the building of more roads with less straining of state and county resources and with increased profits for the contractor.

Beyond even these considerations, however, is the fact that Austin-Western Road Machinery is steadily improving transportation.

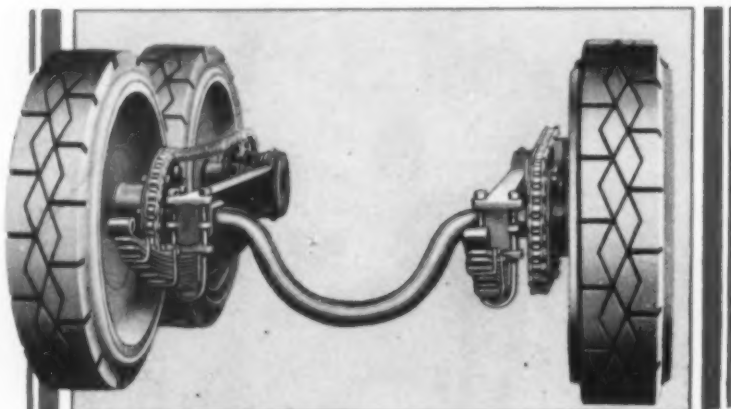
Austin-Western

ROAD MACHINERY

THE NEW

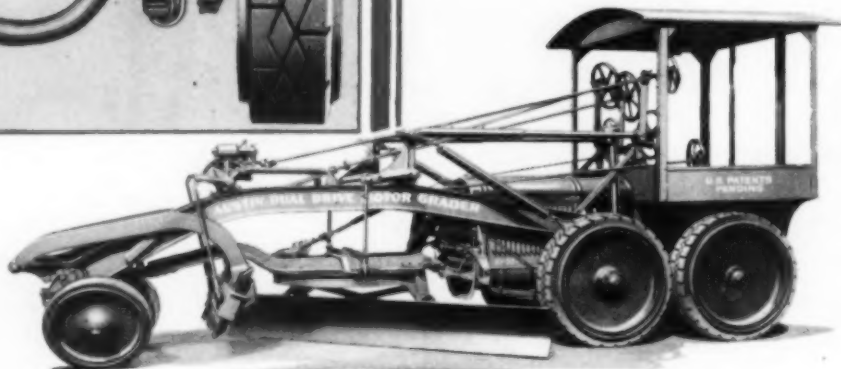


DUAL DRIVE



Dual Drive Construction is the "ace in the hole" that means more power and more traction than has ever before been put behind a blade

10-20 Dual Drive with leaning front wheels and front scarifier



The biggest thing that's ever happened in road machinery!

More power—more traction—for bigger jobs than have ever before been possible. Unquestionably the Austin Dual Drive is the greatest improvement ever made in motor graders—definitely taking them out of the purely maintenance class.

The four drive wheels which carry the tractor as a "floating" power unit are responsible for the superiority of these graders. Each rear drive wheel on its differential axle is connected by a roller bearing drive chain to a similar wheel of the same diameter immediately in front of it, which is the most efficient type of power transmission known and makes drive wheels out of all four wheels.

The two forward drive wheels are mounted on a strong steel axle base at the front of the tractor, and turn freely on their roller bearings. The front end of the tractor, instead of being carried by the frame of the grader, as on previous machines, is carried on its own drive wheels and axle, which in turn are pivotally connected by heavy rocker beams with the rear axle.

By this construction the front end of the tractor has no connection with the frame other than a simple adjusting device to keep it in place between the side

Dual Drive Advantages

More Power
More Traction
Freedom from Skidding and Miring
Perfect Steering
Works in Softer or Wetter Ground

rails without touching either of them. While the front end of the tractor is free to rise and fall on the forward drive wheels, due to any unevenness of the ground, this motion is not transferred to the grader because the only connection between tractor and grader is through the rear axle.

Always, before this, motors used in the various sized machines have had more power than could be used. But tests have shown that the engines in Dual Drive Motor Graders *will kill themselves before the wheels will slip!* This gives extra power at no increase in operating costs.

Dual Drive Motor Graders are built around McCormick-Deering 10-20 and 15-30 tractors. The four drive wheels are alike in size, for which reason the tires are interchangeable—a big saving and convenience to the owner. 50" x 16" tires are used on the 15-30 model. The 10-20 model is regularly fitted with 40" x 6" tires, though 40" x 10" tires are recommended for maximum service requirements.

Other features include a gearless, screw type blade lift—ball and socket joints—leaning front wheels, cabs and snow removal equipment. Front or rear scarifiers are also furnished on order.

Write for complete information

THE AUSTIN-WESTERN ROAD MACHINERY CO.

400 North Michigan Avenue, CHICAGO, ILLINOIS—Branches in principal cities

Leaning Wheel Graders, Straight Wheel Graders, Motor Graders, Elevating Graders, Crawler Dump Wagons, Scarifiers, Rock Crushers, Portable Conveyors, Rollers, Motor Sweepers, Street Sweepers, Sprinklers, Road Oilers, Hot Patch Portable Asphalt Plants, Plows and Scrapers

Other
Wills
U. S.

CON

American Steel & Wire Company

American Wire Rope

MEASURED in the amount of service received, American Wire Rope is the most economical rope made.

You should get Wire Rope on the basis of service. A rope like American Wire Rope will give you reliable service over a long period of time because it is superior rope.

Consult nearest office. Our engineers will select the right rope for your needs.

American Steel & Wire Company

Subsidiary of United States Steel Corporation

208 S. La Salle Street, Chicago

30 Church Street, New York

Other Sales Offices: Boston Cleveland Worcester Philadelphia Pittsburgh Buffalo Detroit Cincinnati Baltimore
Wilkes-Barre St. Louis Kansas City Minneapolis-St. Paul Oklahoma City Birmingham Atlanta Memphis Dallas Denver Salt Lake City
U. S. Steel Products Company: San Francisco, Los Angeles, Portland, Seattle *Export Representatives:* United States Steel Products Co., 30 Church St., New York

REPUBLIC Conveyor Belting

The belt shown is 1225' long, 42" wide, 9 feet high and weighs 13,908 pounds.

Its unusual size is not nearly so important as is the equipment and experience necessary to make a conveyor for any use.

Read what the workman has written on the sign at the bottom of this advertisement.



AN item such as is shown above is in daily use, is as staple to industry as sugar is to the home, therefore, is in constant demand. To meet that demand Republic recommends the Industrial Supply Distributor—his sales force—his warehouse—his service—are prime factors in economical distribution.

This Republic product is well made as time has proven—it's economically made and economically marketed as our distributors' prices prove. Specify it.

THE REPUBLIC RUBBER CO.
Youngstown, Ohio

Belting • Packing • Hose
Molded Goods • Lathe Cut Goods



**REPUBLIC means
the Best Mechanical
Rubber Goods**





Keep Materials Moving

EVERY CONTRACTOR KNOWS

The success of the job depends almost entirely upon the speed and economy with which his loose material is moved.

Prominent engineers, such as those in charge of the Cascade Tunnel and similar projects, staked their reputations on

NORTHERN CONVEYORS

AS THE WORLD KNOWS THEY MADE GOOD!

Made in any length or belt width—portable or stationary—adaptable for handling all loose material fast and cheap.

NATION WIDE SERVICE

A complete stock of repair parts—plus expert service—at following points:

Janesville, Wis.	New Haven, Conn.
Indianapolis, Ind.	St. Louis, Mo.
Grand Rapids, Mich.	Des Moines, Iowa
Detroit, Mich.	San Francisco, Calif.
Cleveland, Ohio	Minneapolis, Minn.

PARTIAL STOCKS AT NUMEROUS
OTHER POINTS

THOUSANDS OF USERS—Everyone Satisfied—TRY ONE YOURSELF



Northern
BUILT BETTER
Portable
CONVEYORS

NORTHERN CONVEYOR & MFG. CO.
Janesville, Wisconsin
Send catalog on Northern Conveyors.

Name

Address

City State

DODGE BROTHERS TRUCKS



CHRYSLER MOTORS PRODUCT



Set your own value standards / / then apply them to a Dodge Truck / / /

YOU know what you expect from a motor truck. You know the peculiarities of your business, of your loads, of the conditions under which you must operate—and you know them a little more intimately than any truck manufacturer can.

We know how to build good trucks . . . we build that kind—more than a million dollars' worth every week.

With sincere respect for your experience we ask your consideration of our truck . . . Set

your own value standards . . . Fix on the speed you need, the power, the truck life . . . Set up your ideal for size, price, appearance, performance . . .

Then inspect the complete line at your Dodge Brothers dealer's . . . You'll find your ideal truck, if it's anything under a 4-Ton, whether you want to haul bricks or bouquets, laundry or lumber, petroleum or paving stones . . . Body and chassis complete . . . Let a painter grace it with your name, then put it to work.

Formerly Graham Brothers Trucks

The complete line of Trucks, Buses and Motor Coaches which Dodge Brothers have been manufacturing and selling under the name of Graham Brothers now take the name of their makers—Dodge Brothers.

These Trucks, Buses and Motor Coaches have always been powered by Dodge Brothers engines. For years they have been built of Dodge Brothers parts in Dodge Brothers plants according to Dodge Brothers standards.

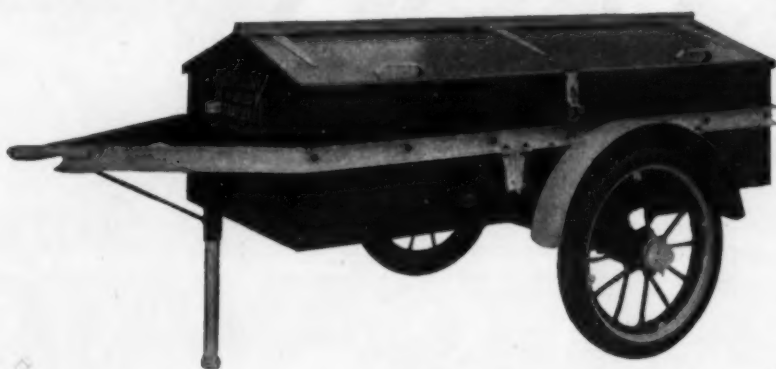
These Trucks, Buses and Motor Coaches are sold, as they always have been sold, by Dodge Brothers Dealers everywhere.

PRICES

MERCHANTS' EXPRESS—110" w. b.	\$ 665
COMMERCIAL TRUCK—120" w. b.	775
1-TON—130" wheelbase	995
1-TON—140" wheelbase	1065
1½-TON—150" wheelbase	1345
1½-TON—165" wheelbase	1415
2-TON—150" wheelbase	1515
2-TON—165" wheelbase	1585
3-TON—135" wheelbase	1745
3-TON—165" wheelbase	1775
3-TON—185" wheelbase	1845

Chassis f. o. b. Detroit

"The Last Word in Modern Equipment for The Progressive Contractor"



*The Mohawk Hi-Speed
Tool Box Will Add to
the Profits on Every
Job.*

Announcing
the NEW

MOHAWK
HI-SPEED
TRAILER
TRADE-MARK

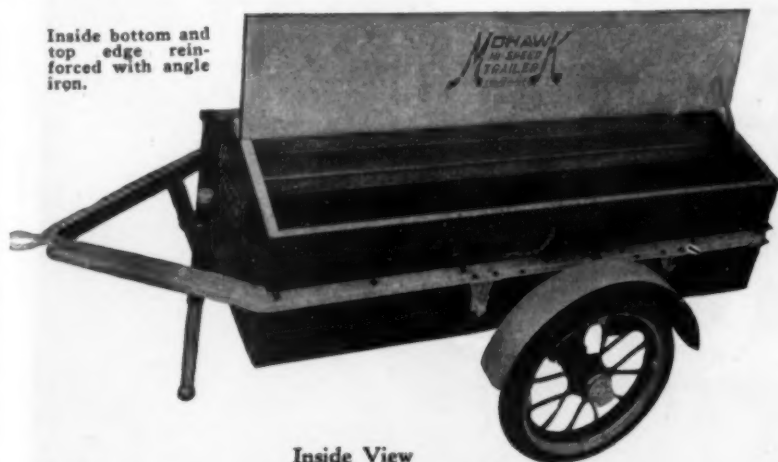
Contractors Portable Tool Box

NO MORE LOSS OF TOOLS BY THEFT, LOAD TOOLS AND LOCK DOWN THE COVERS
NO MORE LIFTING OR LUGGING, HOOK IT TO THE TRUCK AND STEP ON THE GAS

What contractor hasn't wanted a strong portable tool box like this? When exhibited for the first time at the recent Road Show, the Hi-Speed Trailer struck the fancy of every contractor who saw it. Notice the husky construction and careful design of every detail.

Rugged Construction Details: Body made of 10, 12, and 14 gauge steel. Extra heavy welded. Mounted on half elliptic springs. 2 inch axle. Firestone tires and special length roller bearings with alemite fittings. Positive non-slip adjustable supporting leg rigidly connected to channel frame.

Inside bottom and
top edge rein-
forced with angle
iron.



Inside View

Size of tool compartment: 7 ft. long, 3 ft. wide, and 2 ft. high, with sliding tray for small tools, 1 ft. wide by 7 ft. long. Adjustable to center or either side of box.

Use the coupon and let us quote you the *delivered* price
on one or more outfits. →

YES,

Please tell me more about the
Trailer.

Name.....

Address.....

I am a Contractor ☐
I am a Distributor ☐

Mohawk Asphalt Heater Co.,
Schenectady, N. Y.
Write to the Mohawk Hi-Speed

MOHAWK ASPHALT HEATER CO., Dealers and Service Stations in Principal Cities
Main Office and Works, Schenectady, N. Y.

The HAISS EXCAVATOR

Every contractor who has used the new Haiss Excavator or seen one in action has been impressed by its ability to dig continuously at $1\frac{3}{4}$ to 2 cubic yards per minute. For grading, stripping and direct bank digging this machine has set a distinctive mark.

May we send you our new bulletin?

Geo. Haiss Mfg. Co., Inc.
139th St. & Canal Place
New York, N. Y.



A DIGGING MACHINE by HAISS



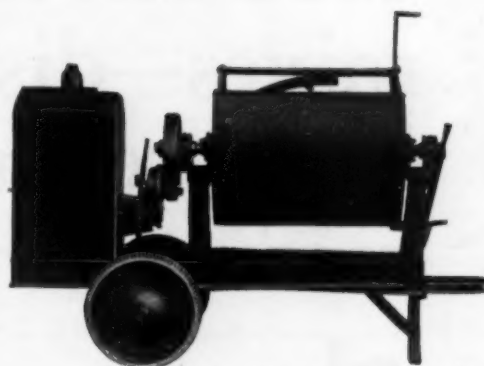
SPEED and STRENGTH LEACH HAS THEM BOTH

ANOTHER pace setter in the Leach line of mixers—the *New, All-Steel Plaster and Mortar Mixer*. Unquestionably a leader in speed in handling batch—in supplying 25 plasterers—in *strength* because of the Leach All-Steel Construction. It's a big time and money saver.

Think of it—all electric-welded steel frame—auxiliary drum clutch lever—self-aligning bearings—steel bar bag holder—can be had with hoisting outfit.



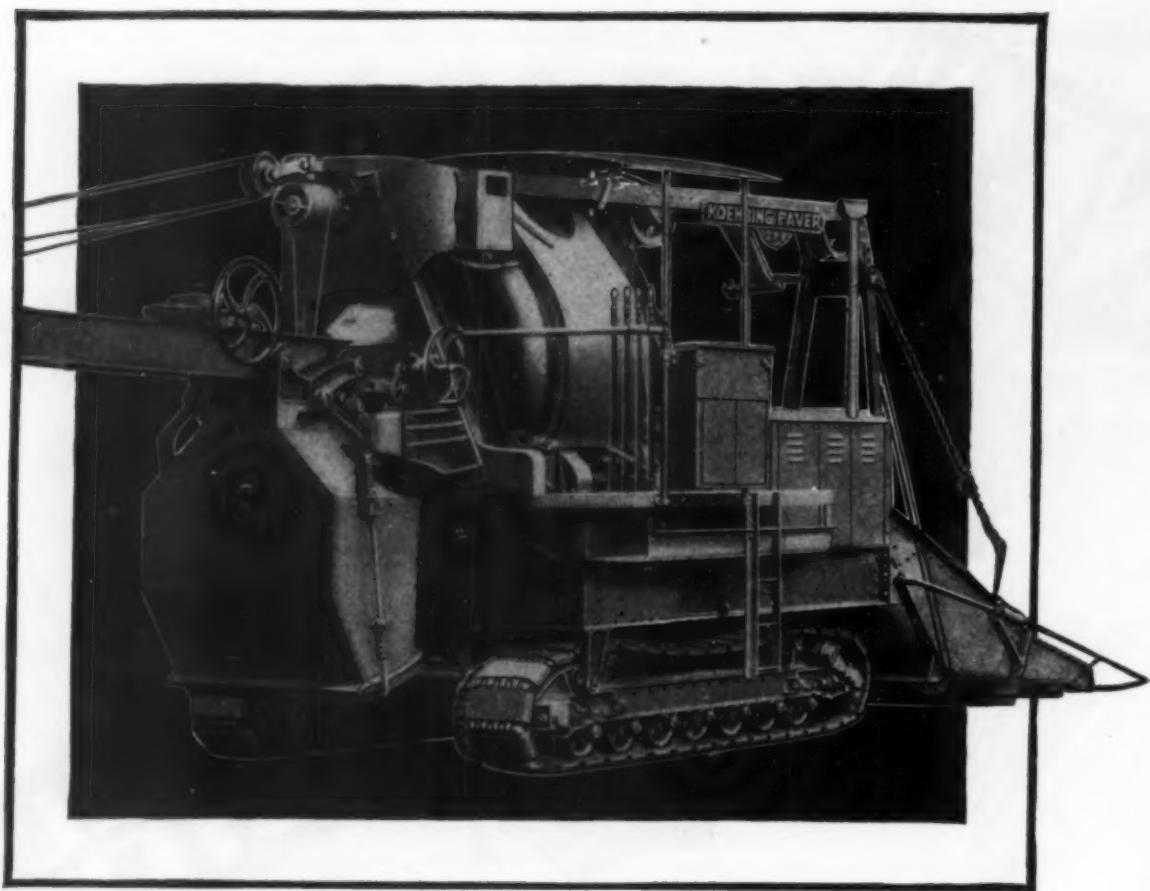
Send for a copy of our new Catalog which completely describes and pictures Leach Plaster and Mortar Mixers. It's yours for the asking. *Write today.*



LEACH COMPANY, Oshkosh, Wis.

LEACH MIXERS

• PLASTER AND MORTAR •



FOR one thing — an automatic cycle of operation that charges — mixes — discharges a batch in 69 seconds, with a one minute mixing period.

The Greater
KOEHRING

A5059-I

Division of National
 Equipment Corporation



CONTRACTORS

ENGINEERS, SUPERINTENDENTS, etc.

*Let us send you FREE
a Sheaf of Money-Making Ideas!*

We would like to send you a set of illustrated descriptions of a series of interesting and unusual jobs where contractors have actually saved real dollars, hours of time or worry—by using their heads.

Why not profit by the other fellow's experience?

In concrete construction, as in other businesses today, the man with the *ideas* makes the money. We never get too old to learn and from this collection of ideas you are apt to pick up a valuable thought which you can apply later to your own work.

You may get a big contract for your trouble—

The jobs which are illustrated and explained cover bridges, highways, tunnels, etc. and usually the conditions to be met required some smart thinking on the part of the men who originally solved these problems. By adapting one of these ideas to the job you are now figuring you may be able to underbid your competitors and still make a handsome profit.

If you are interested in concrete work of any kind, mail coupon today.

GLENS FALLS PORTLAND CEMENT CO.
Glens Falls, N. Y.



**COUPON—
MAIL
TODAY**

GLENS FALLS PORTLAND CEMENT CO., Glens Falls, N. Y.

Alright, send along a free copy of "Money-Making Ideas." I'll look them over.

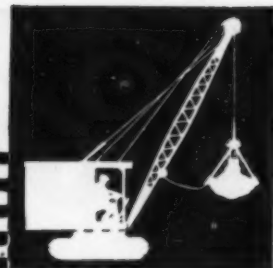
Name

Address

I have { ☐ used ☐ not used } Velo Quick-Hardening Cement.

I have { ☐ used ☐ not used } Iron-Clad Portland Cement.

A Browning Locomotive Crane handling steel work on a construction job.



Browning Builds It *... for your job!*

**You'll find it in a Browning-built to
your job.**

**Locomotive Cranes, Crawler Cranes
and Truck Cranes—steam, gasoline and
electric—afford a size and type for
every need. The name Browning is your
guarantee of greater speed, wider utili-
ty and unmatched economy in each and
every type of handling work.**

THE BROWNING CRANE COMPANY

16226 Waterloo Road

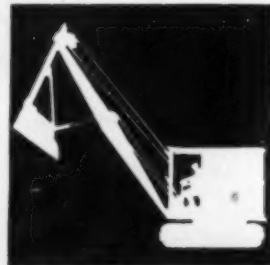
NEW YORK

CLEVELAND, OHIO, U. S. A.

CHICAGO

BROWNING

**LOCOMOTIVE, TRUCK,
AND CRAWLER CRANES**



DISTRIBUTORS

Chicago Los Angeles
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Houston Minneapolis
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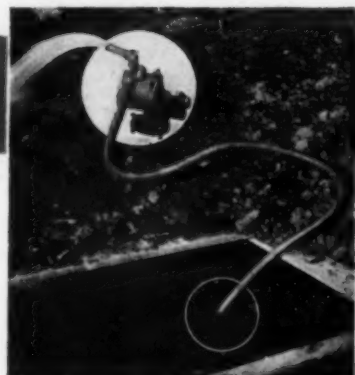
SELF PRIMING



75lb.

**capacity up to
6,000 gal. per hr.**

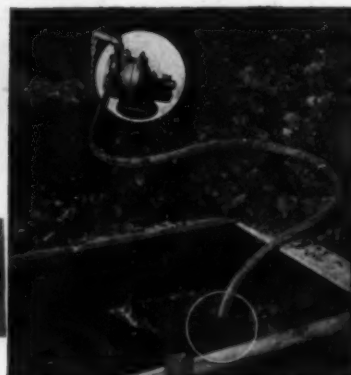
2 purpose pump



volume

or

seepage



Needs no foot valve, no vacuum apparatus, no foundations.

Pumps muddy, gritty water.

Built to stand rough service.

Complete with built-in air cooled gasoline engine. Also furnished with electric motor.

Thousands of Homelites now in service.

**Distributors throughout the world for demonstration and service.
HOMELITE CORPORATION, 75 Riverdale Ave., PORT CHESTER, N. Y.**

⊕ 2202

Homelite

for Economical Transportation



This Great New Six-Cylinder 1½ Ton Truck—\$545

(Chassis only) f.o.b. factory
Flint, Michigan



Illustration shows dump body
mounted on Chevrolet 1½
ton chassis with cab.

32% more Power
**7 inches more
Wheelbase**
**Economy equal to
its 4-Cylinder
Predecessor**
Greater Speed
50% more Capacity
4 Speeds Forward
4-Wheel Brakes

At a price of \$545, the new six-cylinder 1½ Ton Chevrolet Truck makes available a dollar-for-dollar value that has never been duplicated in the commercial car industry!

Its new six-cylinder valve-in-head motor provides a power increase of 32%. It accelerates faster in every gear. It operates smoothly and quietly. And its fuel-economy and cost of maintenance are fully as low as those of its famous 4-cylinder predecessor!

Combined with this increased power and finer performance are a wheelbase of 131 inches and a rugged 189-inch frame—providing a carrying capacity of 1½ tons, with load space up to 9 feet. Throughout the entire chassis are found basic improvements that contribute to its outstanding performance, economy and safety: perfected four-speed transmission . . . ball bearing steering mechanism . . . powerful, quiet 4-wheel brakes, with independent emergency brake . . . and a completely equipped instrument panel!

Investigate this remarkable truck—extremely dependable and economical, it is ideally fitted for *your* business!

1½ Ton Chassis, \$545 1½ Ton Chassis (with cab), \$650 Light Delivery Chassis, \$400
Sedan Delivery, \$595. All prices f. o. b. factory, Flint, Michigan

CHEVROLET MOTOR COMPANY, DETROIT, MICHIGAN
Division of General Motors Corporation

Q U A L I T Y A T L O W C O S T

These valuable books

FREE!

*Examples
of the service
Atlas offers
to contractors*



The Atlas Handbook on Concrete Construction contains 154 pages of information on concrete and reinforced concrete—a treatise so complete that it is used by many Universities as a text book in engineering classes. Will quickly supply the answer to hundreds of construction questions—can be carried in your pocket.

The Atlas Handy Reference Tables—36 tables to simplify computation in construction work. The tables cover quantities needed, proportions of mix, weights, measures, strengths; referring to concrete—mortar—lumber—steel, and building code requirements. They speed up figuring or estimating and help safeguard results.

These indispensable books are only typical of the broad and unstinted service which Atlas renders to the contractor, increasing his business and making it more profitable.

They supplement Atlas consulting service, aiding contractors in making arrangements to handle projects on which they have figured or desire to figure. Other books and many other services are furnished by Atlas through your building material dealer.

For more than 38 years, Atlas Portland Cement has been maintained at a quality standard that has always exceeded every specified requirement. This is the supreme service.

THE ATLAS PORTLAND CEMENT COMPANY
25 Broadway, N. Y.

Gentlemen: Please send me, without cost or obligation, your Handbook on Concrete Construction and your Handy Reference Tables.

Name.....

Address.....

City..... State.....

CM 3

ATLAS PORTLAND CEMENT

GRAY & WHITE
The standard by which other makes are measured

THE ATLAS PORTLAND CEMENT COMPANY, MAIN OFFICES: NEW YORK, ST. LOUIS
BOSTON • ALBANY • PHILADELPHIA • CHICAGO • DES MOINES
OMAHA • KANSAS CITY • OKLAHOMA CITY • WACO • BIRMINGHAM



"Here, Lad—

we've got to do something to get a better percentage of the work we bid on. Maybe we'll have to come to cutting prices."

The Lincoln "Stable-Arc" Welder

- welds easier
- makes better welds
- permits greater output

because of the steady uniform arc throughout entire welding range, which is the result of:

- Variable voltage design
- Laminated magnetic circuit
- Separately-excited generator field
- Double control of welding heat
- All steel construction

No other welder has all these features.

The Lincoln Electric Co., Dept. No. 32-3, Cleveland, Ohio

W-77

"Fine, Pop—

by eliminating the last two words, you've found the answer.

And when we've *come to*, and felt the pulse of the times, we'll see that most of the *best* jobs and the biggest jobs are going to arc welding, *of course*. BUT there's more to it than that:

If we *come to* sufficiently, we'll find that these jobs are going to Lincoln Welder users because they can outspeed machines having lesser qualifications.

I was just reading in a trade paper where a gang of three welders completed 13,900 feet of 8-inch pipe line in one day. (Reprint of this article with job details on request.)

So until we quit bidding against 'Stable Arc' welding and start bidding **WITH** it, we're simply bucking traffic on a one-way street—and the ticket we'll get won't be a meal ticket."

L *"Stable-Arc"*
INCOLN WELDER

ACCEPT NO SUBSTITUTE

Sterling

—“self-lubricating” axle bearing—
guaranteed for the barrow's life—means
longer service and easier wheeling.



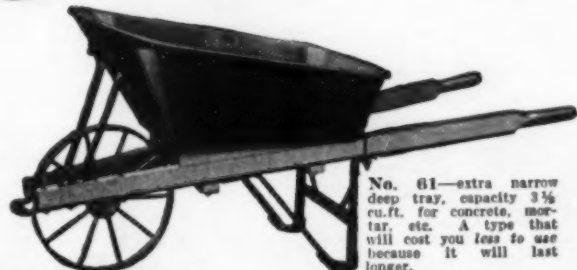
No. 6A—A.G.C. for dry material. Capacity 3½ cu.ft. All Sterling barrows have reinforced tray tops and corners. This is the most popular general type barrow.



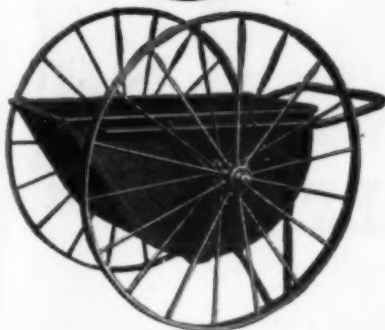
No. 31—large concrete or wet material. Capacity 4 cu.ft. struck. The easiest wheeling big load barrow made. Will outlast others in toughest work.



No. 10A—wide tray, capacity, 4½ cu.ft. A.G.C. standard. Fits all contracting requirements and built to give the longest service. Solid and strong.



No. 61—extra narrow deep tray, capacity 3½ cu.ft. for concrete, mortar, etc. A type that will cost you less to use because it will last longer.



No. 6—the strongest built cart on the market. Full capacity body, no axle inside. Capacity 6 cu.ft. or 1200 lbs. Perfect balance and easiest wheeling. 42-in. wheels.

The above is but a few of the many, many Sterling types—write for complete catalog. Buy by Sterling name—leading hardware and equipment dealers have them or they can get them quickly from

our complete stock warehouses at Chicago, New York, Philadelphia, Pittsburgh, Cleveland, Detroit, St. Louis.

STERLING WHEELBARROW COMPANY
Milwaukee Wisconsin



D I E T Z LITTLE GIANT

*Burns 70 hours
without refilling*

IT is possible to illuminate danger spots to a greater extent than a red lantern will provide—but what then?

Just this! The very uncertainty that exists behind the red light of a lantern is the strongest deterrent to venturesome curiosity—and accidents.

Dietz “Little Giant” Cold Blast Lantern, with a red globe, is one of the finest examples of modern all-round efficiency in a contractor's lantern—bright light—dependability—good looks—and ability to burn over a week-end without servicing.

Try Little Giants. Get them from your Supply Dealer.

Use

RED!

No
other
color
means
danger

R. E. DIETZ COMPANY
NEW YORK

Largest Makers of Lanterns in the World

FOUNDED 1840

DIETZ
LANTERNS

CLYDE

HOISTS - DERRICKS

Completely equipped by Clyde, your best insurance against worry and trouble. Harry Holmes of Pontiac, Illinois, is using a Clyde 2 drum gas hoist with derrick swinging gear attached, to operate his Clyde steel utility derrick. All pile driving and material handling was done with this combination.

*You'll take pride---
in your*



CLYDE IRON WORKS SALES CO.

DISTRIBUTORS FOR CLYDE IRON WORKS DULUTH, MINNESOTA

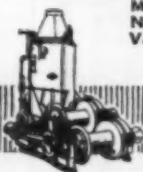
—BRANCHES—

NEW ORLEANS: 309 MAGAZINE ST.
PORTLAND, OREGON: 555 THURMAN ST.
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1325 STANDARD BANK BLDG.



TWO MARKS OF



GUARANTEED QUALITY



On Job *after* Job LACKAWANNA PILING

proves
its worth
and
utility

THE five jobs shown here give only a hint of the many applications of Lackawanna Piling. You see it on every kind of job that involves the retaining of water or earth, both in permanent and temporary work.

You can use Lackawanna Piling under the most difficult conditions with confidence, for it has proved its dependability on thousands of jobs everywhere. Its positive three-point contact joint is strong and water-tight. It drives straight and plumb and penetrates any ground except solid rock. It is manufactured in a variety of sections—one for every class of work.

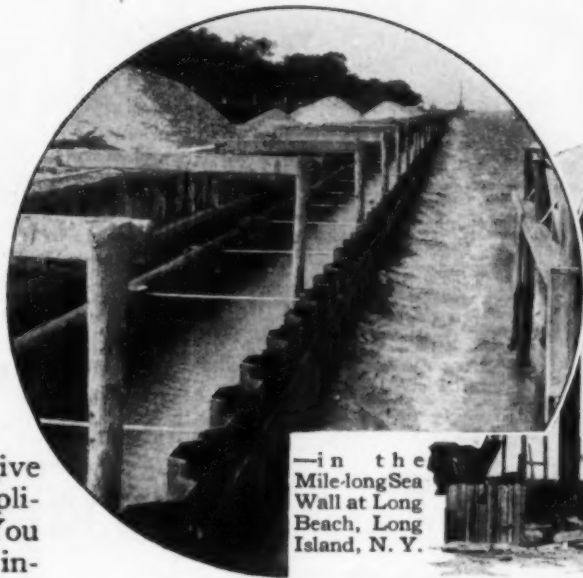
Perhaps you are planning a job in which you could use Lackawanna Piling to advantage. Bethlehem engineers will gladly give you further information. Or mail the coupon for descriptive literature.

BETHLEHEM STEEL COMPANY
General Offices: **BETHLEHEM, PA.**

District Offices: New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Cincinnati, Detroit, Chicago, St. Louis, San Francisco, Los Angeles, Seattle, Portland and Honolulu.

*Bethlehem Steel Export Corporation, New York
Sole Exporter of our Commercial Products*

BETHLEHEM



—in the
Mile-long Sea
Wall at Long
Beach, Long
Island, N. Y.

—in cylinders for
columns of the
D. L. & W. R. R.
Bridge across the
Hackensack River



Below—in double-wall coffer-dams for piers of Kill Van Kull Bridge.



Left—in construction of a collecting sewer,
Philadelphia.



Right—in construction of a
graving dock,
Brooklyn, N. Y.

Clip 1

CM1

Bethlehem Steel Company
Bethlehem, Pa.

Kindly mail me Bulletin
115, describing Lackawanna Piling Sections:

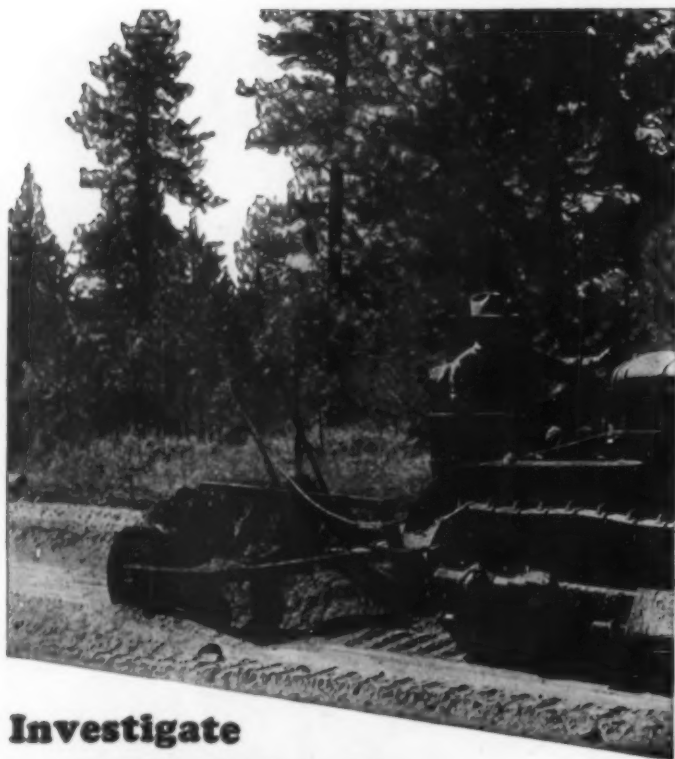
NAME:

ADDRESS:

CITY:

STATE:

COMPANY:



Investigate

Killefer Scrapers

{ if you want outstanding performance. You will find in these unusual scrapers-- }

A new development in steel for the shoes—

Quick, simple size-of-load adjustment—

An accurately adjusted "bite"—

Bolted-in, reversible, double blades—

Ease of control—by the tractor operator—

A full line in sizes from 4' to 8' wide, capacities from 18 to 105 cubic feet, dirt measure—

The whole line strong, heavy, fairly priced.

Our 5' model is shown above. These tools have been 6 years on the American market. There are hundreds of enthusiastic users. Sales Agencies throught the United States and Canada. For descriptive literature write Killefer Mfg. Corp., 5525 Downey Road, Los Angeles.

OK

HOIST AWAY with an O. K. PORTABLE HOIST

THE O. K. Portable Hoist is a profitable hoist, too! Profitable because it stands up under all conditions of service — profitable because it shoulders any job—loading and unloading materials, hoisting supplies, operating scrapers and drags and running portable elevators.

They are carefully built for their job—heavy engines, powerful brakes and double friction clutches asbestos-lined. And it's portable—goes anywhere and does a good job when it gets there!

More details are yours for the asking!

At the same time get the facts on

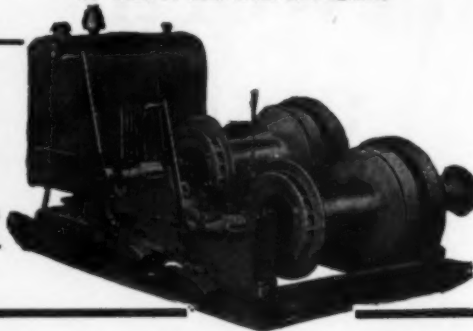
O. K. Portable Compressors and

O. K. Portable Elevators

We want to hear from live agents.

O.K.
Portable
Elevators

O.K.
Air
Compressors



O.K. Clutch and Machine Co.

P. O. BOX 305
COLUMBIA, PENNA.

**To make your unwatering and
water supply problems easier!**



THIS Morris Portable All-Purpose Pump handles anything from clear water to floating dirt, sand and gravel, delivers 300 to 600 gals. per min., can be used for heads up to 50 ft., and is easy to cart from one job to another. For general water supply, unwatering excavations, sumps, etc., it can't be beat.

*Write for literature about this and other sizes
of Morris Pumps*

MORRIS MACHINE WORKS, Baldwinsville, N. Y.

MORRIS

CENTRIFUGAL PUMPS

400%

"Yesterday I could only report 300 per cent increase, but here's one for 400 per cent—and on a _____ skimmer Scoop Shovel which the Superintendent says is 'Hell on Cable'."

The superintendent must be right because competitive brands of rope used on his skimmer gave an average of only one week's service. The first one lasted four weeks and the second, which has been on the skimmer for nearly a month, is still in service.

400%

is a tremendous increase in service but it is quite common where Tru-Lay wire rope is put in under extreme conditions of service, such as machines requiring sharp reverse bends, and on hoisting

work requiring long lengths of wire rope—particularly where spinning is likely to develop.

If you have a hard job, let us show you what Tru-Lay will do. No obligation. Sample and complete information on request.

AMERICAN CABLE COMPANY, Incorporated

Grand Central Terminal Building, NEW YORK, N. Y.

District Offices: Chicago, Detroit, Philadelphia, Pittsburgh, Tulsa, San Francisco

An Associate Company of the American Chain Company, Incorporated

Dominion Wire Rope Company, Limited, Montreal, Sole Canadian Licensed Manufacturers



PREFORMED WIRE ROPE

TRADE **TRU-LAY** MARK

(Reg. U. S. Pat. Off.)



Detroit International Bridge



Philadelphia-Camden Bridge, The World's Greatest Suspension Bridge

American Cable is used on the World's Greatest Bridges

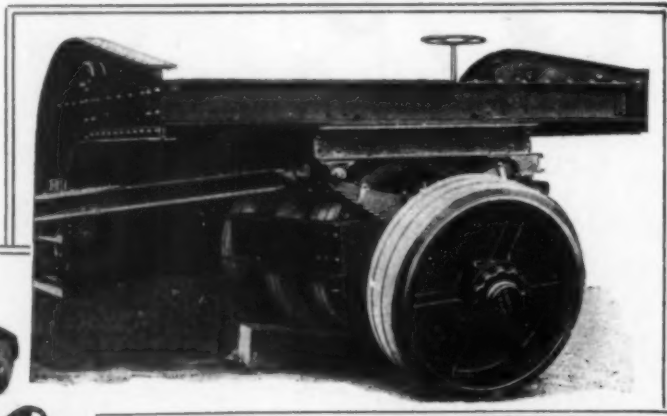


Mt. Hope Bridge, Bristol, R. I.

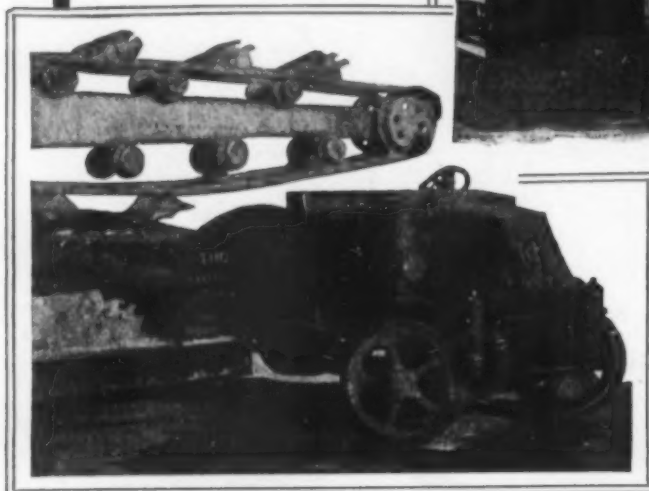
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of New Catalog
Write to

**ROGERS
BROTHERS
CORPORATION**
106 Orchard St.
Albion,
Pa.

ROGERS TRAILERS
GOOSE NECK HEAVY DUTY



Note
oscillating
front axle
furnished on
extra heavy
duty trailers



Both semi-trailers and
full trailers turn easily as
much as 90 degrees



*Deep Sea Diver works on the site of the
new Commerce Building in Washington.
Contractors installing pilings for the founda-
tion were so hampered by water from
underground springs that the diver was
called in to dig a well into which the water
will collect and then be carried off by
powerful pumps.*

—WASHINGTON NEWS ITEM.

Handling Quicksand

It's your problem. You can pump it—sump it—
—drain it—sheet it—brace it—freeze it—
damn it—call a cop—hire a diver—fight it
out on some line if it “takes all summer.”
“Everyone to his taste,” as the old lady said
when she kissed her cow!

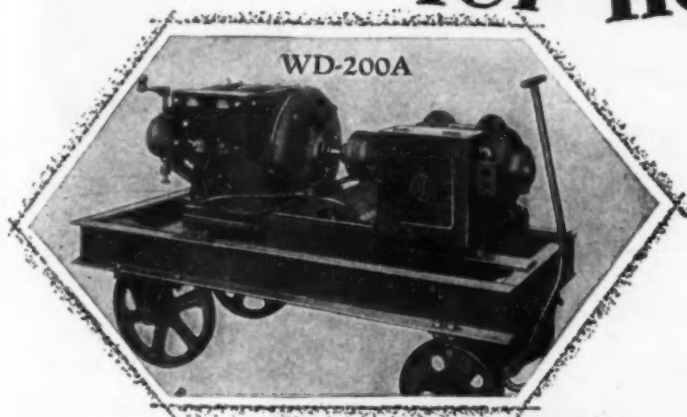
NOW LISTEN—right after the diver called
it a day, the Rust Engineering Company of
Pittsburgh bonedried a “Wet One” on the
other side of Washington—the big addition
to the Government Public Printing Bldg., just

forty-eight hours from
slop to stability
with a

COMPLETE
**MORETRENCH
WELLPOINT SYSTEM**

MOORE TRENCH MACHINE CO.
ROCKAWAY, NEW JERSEY

3 remarkable machines for hand welding



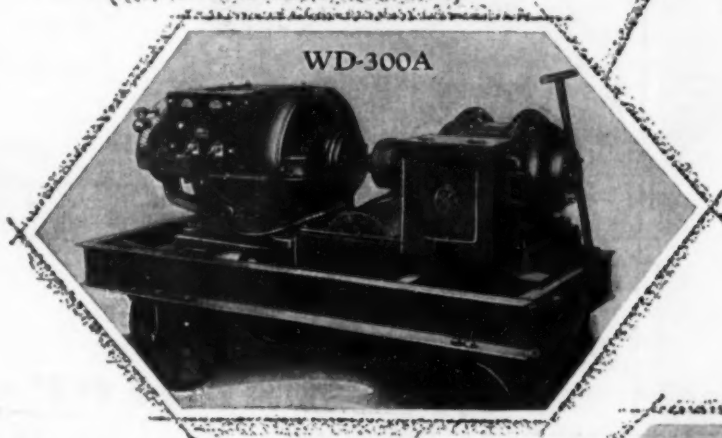
WD-200A

General Electric presents a new line of Type WD arc welders with all the good features of the old line plus new features which permit an ease of welding never before obtainable from any welders.

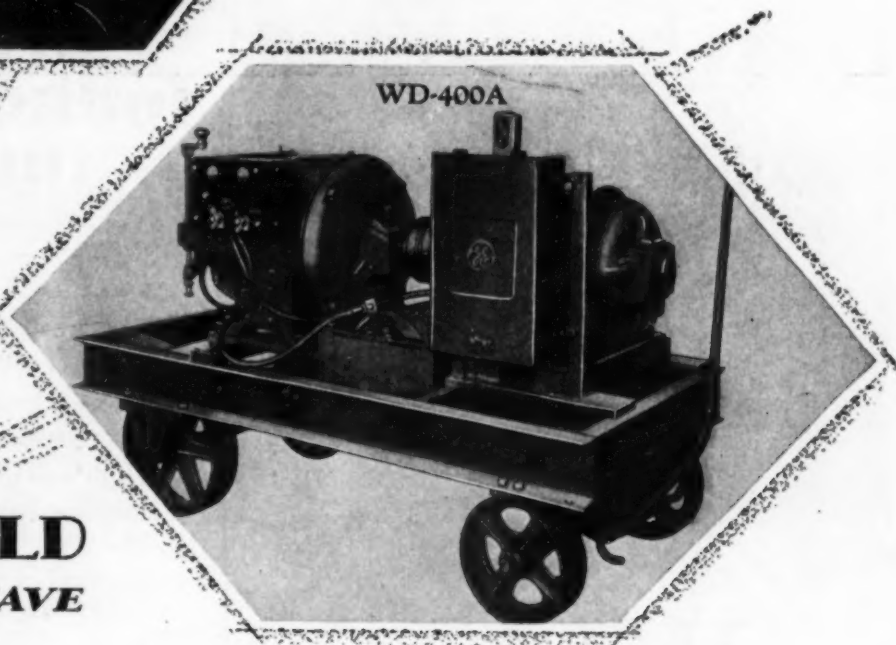
Your operators will like them because they have loads of pep for fast, high-grade welding. Because they hold the arc with remarkable steadiness. Because they permit an infinite number of current gradations by the simple turning of a handle.

You'll like them because they are the most substantial sets built. Because they are simple—no exciters or rheostats to require maintenance. Because they meet the standards of the National Electrical Manufacturers Association.

Ask your nearest G-E office to send you descriptive literature.



WD-300A



WD-400A



THE
MORE YOU
ARC
WELD
THE MORE YOU SAVE

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

When road work opens this spring—

Be ready with dependable equipment which will do the work in the quickest way . . . which can be used under all conditions . . . which will do the hard job and the easy one.

Warco road machinery is your best bet—it has the stuff—try it out and be convinced.



Above

The Warco model KM Alwatrac speeds up road work for a drawn grader.

Right

The new 1929 Warco 10R Road Hog doing a job of ditching.

Below

The Warco Wheeled Scoop, operated singly or in trains, levels the ground and spreads the dirt evenly or dumps in a pile.



Spinning the freely turning wheels in the cab, operates the screw through the circle controls, and easily raises and lowers the grader blade.

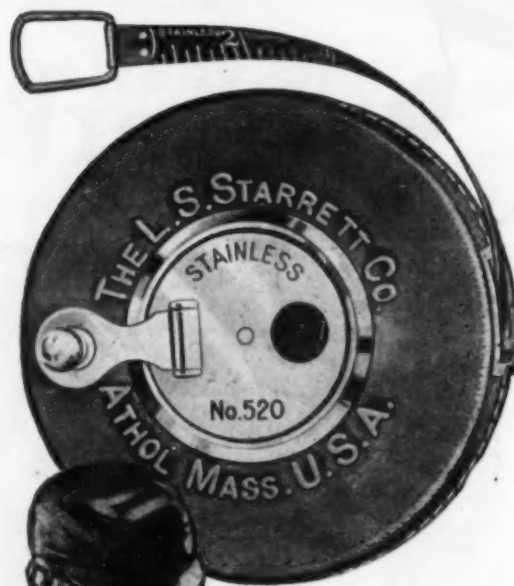
*The
Warco
Screw
Lift*



*"Built
like a
Screw
Jack"*

Warco PRODUCTS

W. A. RIDDELL CO., BUCYRUS, OHIO



*Starrett
Stainless
Steel
Tape
No. 520*



Salt water- ditch water- foundation work- tunnel work-

Use a Starrett Stainless Steel Tape No. 520—that is the work it is made for.

The genuine stainless steel tape does not corrode under the hardest kind of work. It is tough, continual wiping off the muck or mud leaves the markings still clear and sharp.

Write for the Starrett Catalog No. 24 "NF" which describes over 2500 Starrett Tools. A post card will bring your copy.

THE L. S. STARRETT CO.
*World's Greatest Toolmakers
Manufacturers of Hacksaes Unexcelled
Steel Tapes—Standard for Accuracy
ATHOL, MASS., U. S. A.*

Use Starrett Tools

Diaphragm Pumps: two 4-inch models, capacities 5,000 to 12,000 g.p.h., also two models double diaphragm.



Rex Enters the Contracting Pump Field ~ ~ ~ ~ ~

~ ~ ~ with this Modern Line of Diaphragm, Centrifugal, and Pressure Pumps

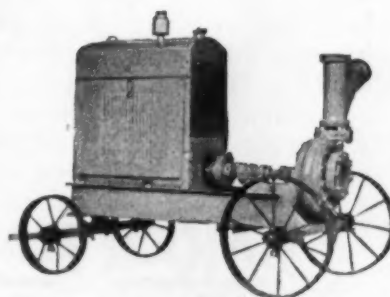
Rex sees the contractor's need of these two things in pumps:

- (1) a modern engineering mind unbound by precedent
- (2) modern standardized production that will provide greater value

After watching a similar policy help Rex Mixers and Pavers set a brilliant pace in their industry, Rex intends to duplicate that success in a line of diaphragm, centrifugal, and pressure pumps.

Now that most members of this new Rex Pump Line have seen a full year of actual field service, in addition to exhaustive test runs, Rex enters the field with pumps of sweepingly modern design, built on a modern standardized production basis that actually sets a new standard of value for the contractor's pump dollar.

The Rex Pump Catalog gives you complete details—to establish standards of modern pump value send for a copy.



Centrifugal Pumps: three sizes, 3-inch, 4-inch, and 5-inch.



Road and Pressure Pump, automotive design throughout, vertical pump, capacity up to 80 g.p.m., pressure up to 500 pounds.

REX PUMPS

Reg. U. S. Pat. Off.

CHAIN BELT COMPANY
764 Park Street, Milwaukee, Wisconsin



Out Performing!

By sheer merit Baker Maney Self Loading Scrapers have held their high place in the estimation of practical dirt movers. By outperforming other equipment in their field, they are forcing their way into the equipment of thousands of contractors and road officials. Their performance speaks for itself.

When you consider that two or three men can move as high as sixty cubic yards per hour with a single Baker Maney outfit, you can begin to see why their performance has brought them into such world-wide use on all kinds of earth-moving jobs. Let us have information on your earth-moving jobs. We will be glad to recommend the proper number of scrapers and model best suited to your job.

BAKER MANEY Self Loading Scrapers

Model D, 1½ yd., Model G, 1 yd., Model H, ¾ yd.

Another Baker Product

For the short
hauls use

BAKER
ONE MAN
ROTARY
SCRAPERS



BAKER ROTARY SCRAPER

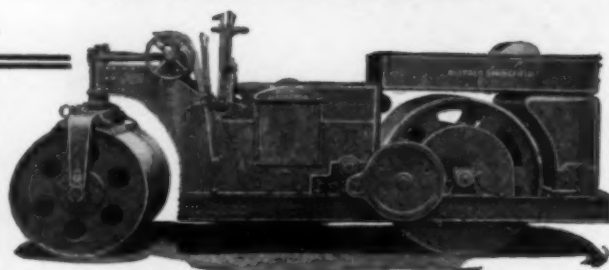
They are made better, stronger and have larger capacity. Made in four sizes from 13 to 40 cu. ft. for any Tractor.

Write for the following Catalogs:

- Baker Maney Self Loading Scrapers ☐
Baker One Man Rotary Scrapers ☐

THE BAKER MANUFACTURING CO.
568 Stanford Avenue, Springfield, Illinois

There are Always Sound Reasons

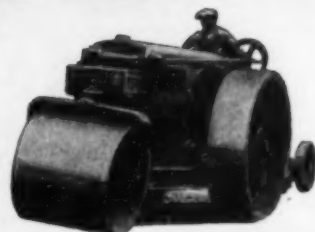


for
Buffalo-Springfield
Supremacy

Which reasons are to be found in the many years of specialized experience back of the men who design and build them—in the up-to-dateness of design of the various models—and in their adaptability to road construction requirements.

Steam and motor driven rollers in all practical sizes. Scarifiers and other special attachments optional.

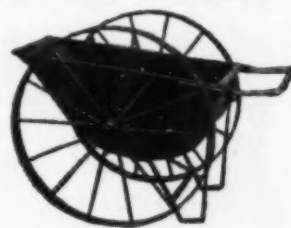
Write for illustrated booklet describing the Buffalo-Springfield line.



The Buffalo-Springfield
Roller Co.
Springfield, Ohio

Buffalo-Springfield ROAD ROLLERS

Cutting Construction Costs



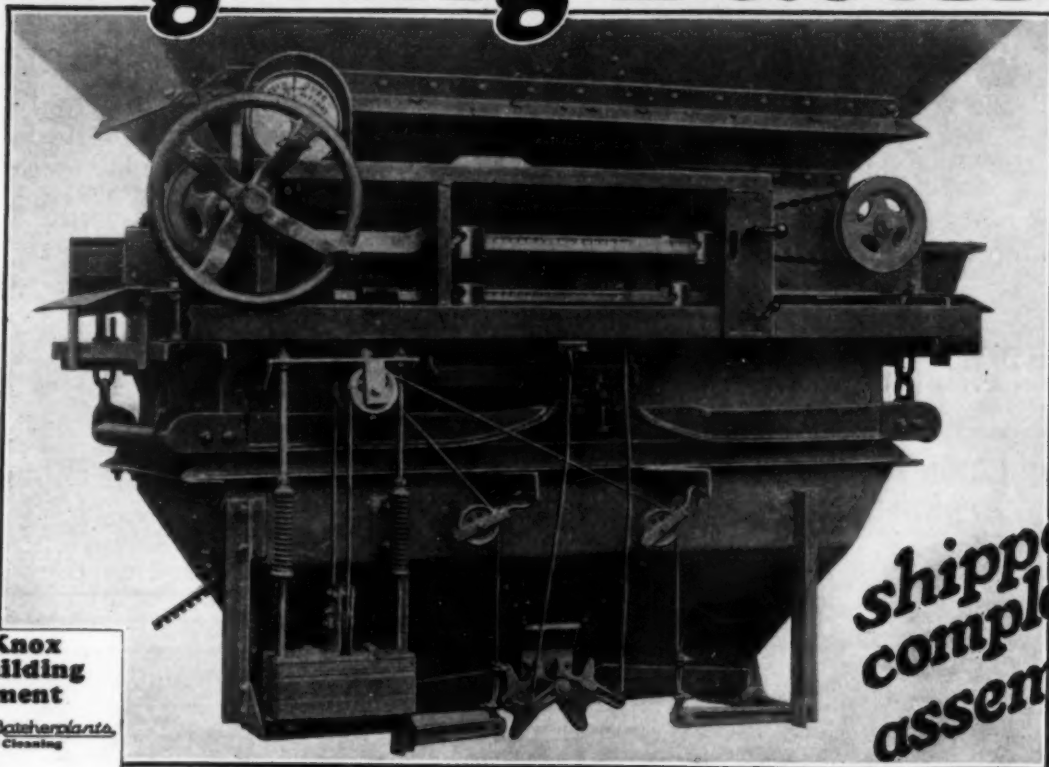
Most contractors know that our engineers have developed a line of barrows and carts that sharply cut the cost of material handling. They are designed to do the most work with the least effort. This Bull Frog Concrete Cart is only one of many Bull Frog barrows, carts, and scrapers for every mill, mine, contracting, and industrial use. Write for catalog.

The Toledo Wheelbarrow Company
Toledo, Ohio

Branch Office and Warehouse:
Chicago, 69 E. Wacker Drive

BULL FROG WHEELBARROWS

The Ultimate Weighing Batcher



*shipped
completely
assembled*

Blaw-Knox Road Building Equipment

Steel Bins - *Batchers*
Portable, Self Cleaning

Road Forms
Steel Forms

for Streets and Sidewalks

Weighing Batchers

Volume Batchers

Cement Weighing

Batchers

Agitator Truck Bodies

Ready Mixed Concrete

Plants

The Blaw-Knox

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Sand, Gravel and

Coal Gates

Truck Turntables

The Blaw-Knox

Inundation System

Clamshell Buckets

Dragline Buckets

Electroformed Steel

Grating and Flooring

Blaw-Knox *Reinforced* Steel

Standard Steel Buildings

Steel Forms *Blawforms*

for General Concrete

Construction

The 1929 Blaw-Knox WEIGHING BATCHER is faster, more reliable, and a better time and labor saver than ever before—perfected to fully meet the requirements of the construction industry.

The Blaw-Knox WEIGHING BATCHER is arranged to weigh one, two, or more materials in one weighing hopper and with only one set of scale mechanism.

A separate beam is provided for each material. A poise is set on each beam for the required weight and need not be moved thereafter. A flip of a trigger brings each successive beam into action. Blaw-Knox WEIGHING BATCHERS can now be shipped completely assembled with scale mechanism attached—they need never be dismantled. The entire scale arrangement is easily and quickly leveled by the adjustment of only four bolts.

SCALE EQUIPMENT is the best that money can buy—made by the most responsible, experienced scale manufacturers in the United States, and conforms to the U. S. Bureau of Standards requirements. Automatic weighing action is provided by means of volume control and indicator dial attachment.

Blaw-Knox Engineers take pride in the fact that they have developed a real WEIGHING BATCHER, far superior to anything else on the market.

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686 Farmers Bank Bldg., Pittsburgh, Pa.

New York, 342 Madison Ave.
Chicago, Peoples Gas Bldg.
Cleveland, 526 Union Bldg.

Birmingham, Brown-Marx Bldg.
Philadelphia, 332 Widener Bldg.
San Francisco, 1007 Financial Center Bldg.

Buffalo, Genesee Bldg.
Detroit, Lincoln Bldg.
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Boston, 605 Statler Bldg.

SALES AND SERVICE THROUGHOUT EVERY PART OF THE UNITED STATES



BLAW-KNOX

CATALOG
KHD



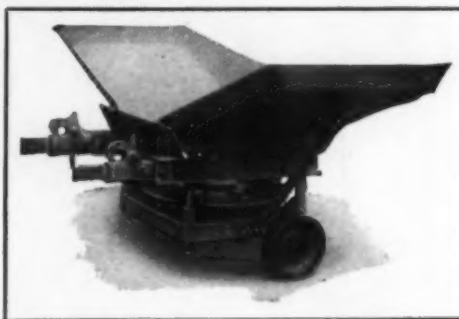
The Most Highly Efficient
Bituminous Distributors
Today

Are the New
"CHAMPIONS"

SAFETY AND SIMPLICITY
are dominant features in these
DISTRIBUTORS, which represent
the very latest development
in equipment for the mechanical

application of asphalts, tars, and oils to road and street construction and maintenance.

At right:—Good Roads "Husky" Chip Spreader. Its all that the name implies, STRONG—DURABLE—EFFICIENT. The spreader you've waited for.
Bulletin KCS.



THE GOOD ROADS MACHINERY CO., INC.
KENNETT SQUARE, PA.

Philadelphia

New York

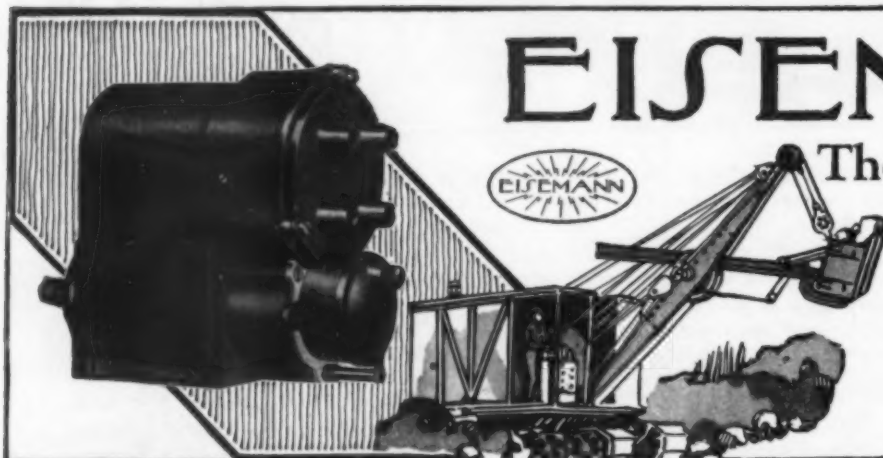
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The Foremost Magneto

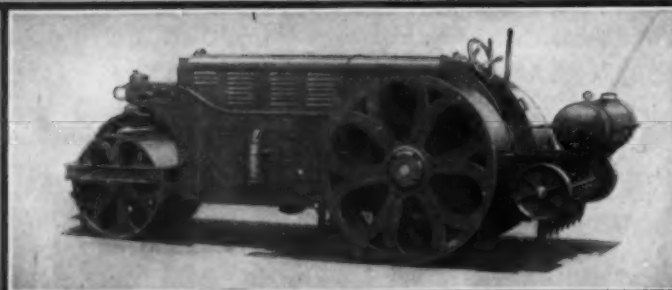
for Construction Equipment

The overwhelming choice of the
builders of high quality equip-
ment. Favored by contractors
everywhere.

EISEMANN MAGNETO CORPORATION
165 Broadway - New York

HUBER

4 CYLINDER
MOTOR ROLLERS
POWERFUL AND
DEPENDABLE
QUICK IN ACTION
ECONOMICAL TO
OPERATE



MADE IN FOUR SIZES
5—7—10—12
TONS
SEND FOR HUBER
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315 E. CENTER ST.

THE HUBER MANUFACTURING CO.

MARION, OHIO

**The
Super**

IRON MULE

4

**Good Yards
a Load**



HERE'S the Super "Iron Mule," a larger, more powerful short haul dirt mover that will give even bigger profits than the now famous 2-yard "Iron Mule." It will keep the bigger shovels working at maximum capacity.

This is not an experiment, it's the result of 5 years actual experience in design, manufacture and observation of "Iron Mule" equipment in actual use. Here are a few of the major factors that make the Super "Iron Mule" the greatest profit-maker dirt moving contractors have ever put on the job. It's a complete tractor dump, a dump body of over 4-yard capacity (with crowned load) mounted on the sturdy 10-20 McCormick-Deering Tractor which is equipped with crawler tracks of special design. These will traction this giant dirt mover over roughest going—take it, without hesitation, up a 20% grade with its huge 4-yard load and into places where trucks and teams can't get. The power hoist gives positive dumping—up hill or down and easily dumps full load in 4 to 5 seconds. Body is built for bulldozing, from 4" up. It's exceptionally wide—even the biggest shovels can't spill over the sides.

Driver can spot under shovel or drag line instantly and run up to the edge of fill easily and quickly because he is always facing load.

See "Iron Mules" in action. Figure the cost and profit-per-load against any equipment you've ever used and you'll be overwhelmingly convinced that nothing can lick "Iron Mules" for short-haul dirt moving. Write for illustrated broadside today. Get information, too, about the 2-yard "Iron Mule" and the complete line of Hughes-Keenan's famous Dump Bodies.



THE HUGHES-KEENAN COMPANY, MANSFIELD, OHIO

IRON MULE



TRADE MARK REG.
U.S. PAT. OFF.

TRACTOR DUMP

MOUNTED ON MCCORMICK-DEERING

Compare material and handling cost

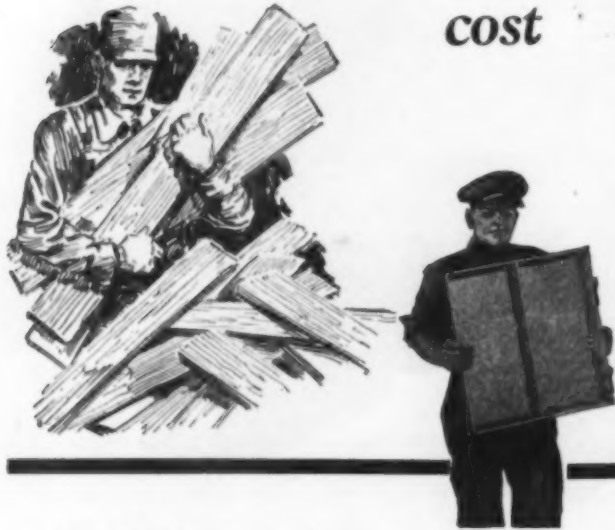
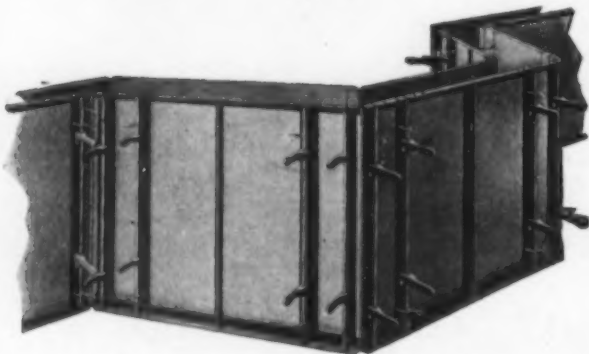


Figure the difference in cost of skilled labor building and erecting wood forms and ordinary labor for erecting Metaforms—of expensive lumber wasted after each job and the years of service on job after job from Metaforms—and lastly, the cost of moving and storing bulky wood forms as compared with Metaforms in convenient one-man units.

These are the main cost-saving advantages. Full details of their application and features of design will be sent you on request.

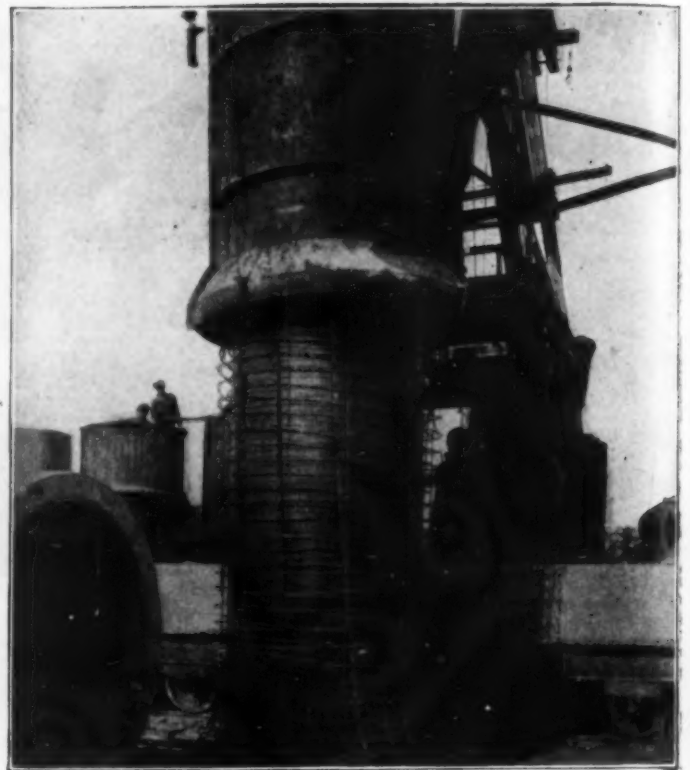
Metaforms for every form building requirement



Let us tell you what you can do
with Metaforms on straight wall
or circular concrete construction.

METAL FORMS CORPORATION

Milwaukee, Wis.



Green Boots Construction Co., Oklahoma City, Okla., Contractor.
C. E. Bretz—Supt. of City Water Works, Oklahoma City, Okla.—Engineer.

The largest reinforced concrete pressure pipe job in the world!

Ten miles long, each section 54" inside diameter, 13 feet long, weighing about 7½ tons.

Over a Million Bates Bar Ties Used because of their practicability and economy.

On that next reinforced concrete job of yours, use

Bates

BAR TIES

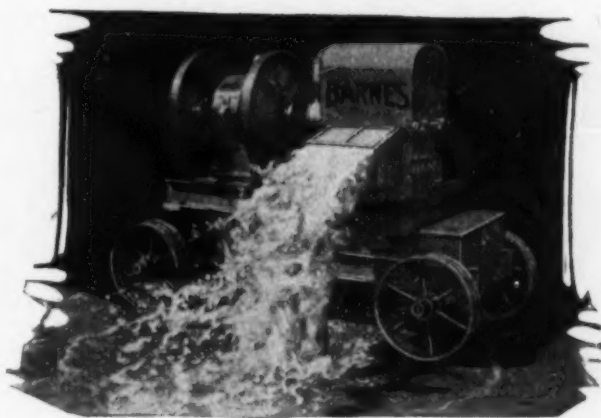
Jobbers in all principal cities

BATES VALVE BAG CORPORATION
35 EAST WACKER DRIVE
CHICAGO, ILL.

BARNES POWER DIAPHRAGM PUMPS

*Keep Excavations Dry
Efficiently and Economically*

You can save money on drainage projects with Barnes Pumps. This fact has been proved time and again by contractors who know comparative values—and who know from actual experience that Barnes pumps are built to give maximum service with minimum "time-out." Time wasted is money lost. You can eliminate lost time if you put Barnes pumps to work. They settle down to their job of keeping excavations dry without constant attention and expense. The features below are a few reasons why contractors are turning to Barnes.



The Barnes Single Diaphragm



The Barnes Duplex Diaphragm

These Features are Standard On All Barnes Pumps:

1. All bearings protected from dust and dirt.
2. Smallest number of working parts.
3. Cut steel gears.
4. Dust-proof, oil-tight gear case.
5. Forged steel crankshaft.
6. Replaceable bronze bearings.
7. Accessible suction valve.
8. Quickly replaceable diaphragm.
9. Low center of gravity.
10. Maximum suction lift.
11. Capacity single pump 10 to 12,000 g.p.h.
12. Capacity duplex pump 20 to 24,000 g.p.h.

The Barnes Duplex Diaphragm Pump

is a new development in pump design. It has fewer parts, better accessibility and larger capacity.

THE BARNES MANUFACTURING COMPANY
923 Main St., Mansfield, Ohio

*Mail this coupon
for complete data*

The Barnes Manufacturing Company,
923 Main Street, Mansfield, Ohio.

Please send me complete information about Barnes Drainage Pumps.

Name
Address
City State



TRENCH WITH DRY WALLS AND BOTTOM 21 FEET BELOW WATER LEVEL.

Absolutely dry trench—21 ft. below water level! "DOMESTIC" DRAINAGE SYSTEMS AND PUMPS DID THE TRICK

To lay pipe in water-soaked sand 21 feet below water level is usually a difficult job—but—"DOMESTIC" Pumps and "DOMESTIC" Point Drainage gave firm sides and dry bottom trench on this job at Gary, Indiana.

If your job requires the drying up of specified areas—for trench work, foundation work, etc.—in water-soaked soils, our Bulletin No. 288 will interest you. This "copyrighted" illustrated booklet contains much data of real value to every Engineer and Contractor. A copy is your FREE—for the asking.

"DOMESTIC"
Drainage Systems
give
Safety, Speed and
Profits

on jobs below the surface of
water saturated soils.



Special Double Plunger Pump successfully used with "Domestic" Point Drainage Systems

DOMESTIC ENGINE & PUMP CO.
Shippensburg, Penna.

CM 3-29

You Can Prevent Concrete Failures

Frequent compression tests are not only now required on all large contracts, but are absolutely essential from a standpoint of safety.

The illustration shows one of our 200-ton hydraulic presses arranged especially to test concrete test cubes, cement, stone, etc.

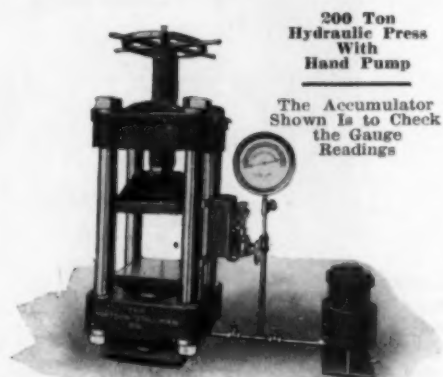
We also build Jacks for underpinning and heavy lifting; Bending Presses for bending pipe, bars, etc. Shears for reinforcing bars; Punches for structural shapes, etc.

Write for Bulletins

THE WATSON-STILLMAN CO.
1014 Evening Post Bldg., New York City

Chicago, 549 W. Washington Blvd.
Cleveland, Auditorium Garage Bldg.
Philadelphia, Widener Bldg.

Detroit, 2976 W. Grand Blvd.
St. Louis—795 Olive St.
Pittsburgh, Farmers Bank Bldg.



200 Ton
Hydraulic Press
With
Hand Pump

The Accumulator
Shown Is to Check
the Gauge
Readings



HUMDINGER PUMPS

Non-clogging, everlasting rubber ball valves, totally enclosed, running-in-oil jacks, bronze bushed bearings, all steel trucks, and enclosed engine crank cases make HUMDINGER PUMPS.

THE CONTRACTOR'S CHOICE

Full detail description given in Bulletin No. 1034 CM. Send for a copy.

RALPH B. CARTER CO., 126 Chambers St., New York
Factory: Hackensack, N. J.

EASIER AND BETTER CURING WITH GRASSELLI SILICATE OF SODA

WHEN you use Grasselli "R-B" for curing concrete roads and streets, you reduce your overhead by eliminating the largest part of the curing gang. Two men with brooms or spray rig do the whole job without dirt, delay or argument.



Removing
"R-B"
from drum



Diluting
"R-B"
with water



Brooming "R-B" on road surface



Spraying "R-B" on concrete base

You owe it to yourself and to the public to get complete information on this latest and approved method that insures better roads at less cost.

Literature showing how "R-B" saves time, work and expense will be gladly sent on request.

THE GRASSELLI CHEMICAL CO.

ESTABLISHED 1839

CLEVELAND, OHIO

Branches in 18 Cities

GRASSELLI GRADE

A Standard Held High for 90 Years

THE RIGHT TOOL SAVES TIME

FOR BETTER CONCRETE WORK

Here is a tool designed especially for cement contractors and those engaged in the building of concrete walls, walks and drives. Shank and handle are offset from plane of blade so that it can be pushed down flush with the side of the form. This brings fine concrete toward the form and insures a smooth surface, after form is removed. Improves the appearance and makes a more satisfactory job. Saves time over a makeshift tool not designed for this work.

Blade is 7" wide, slotted. Handle—selected ash.

The brand True Temper is burned in the handle to mark each tamper as the best tool of its kind that can be made.

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A Sensational Performer and Money Saver

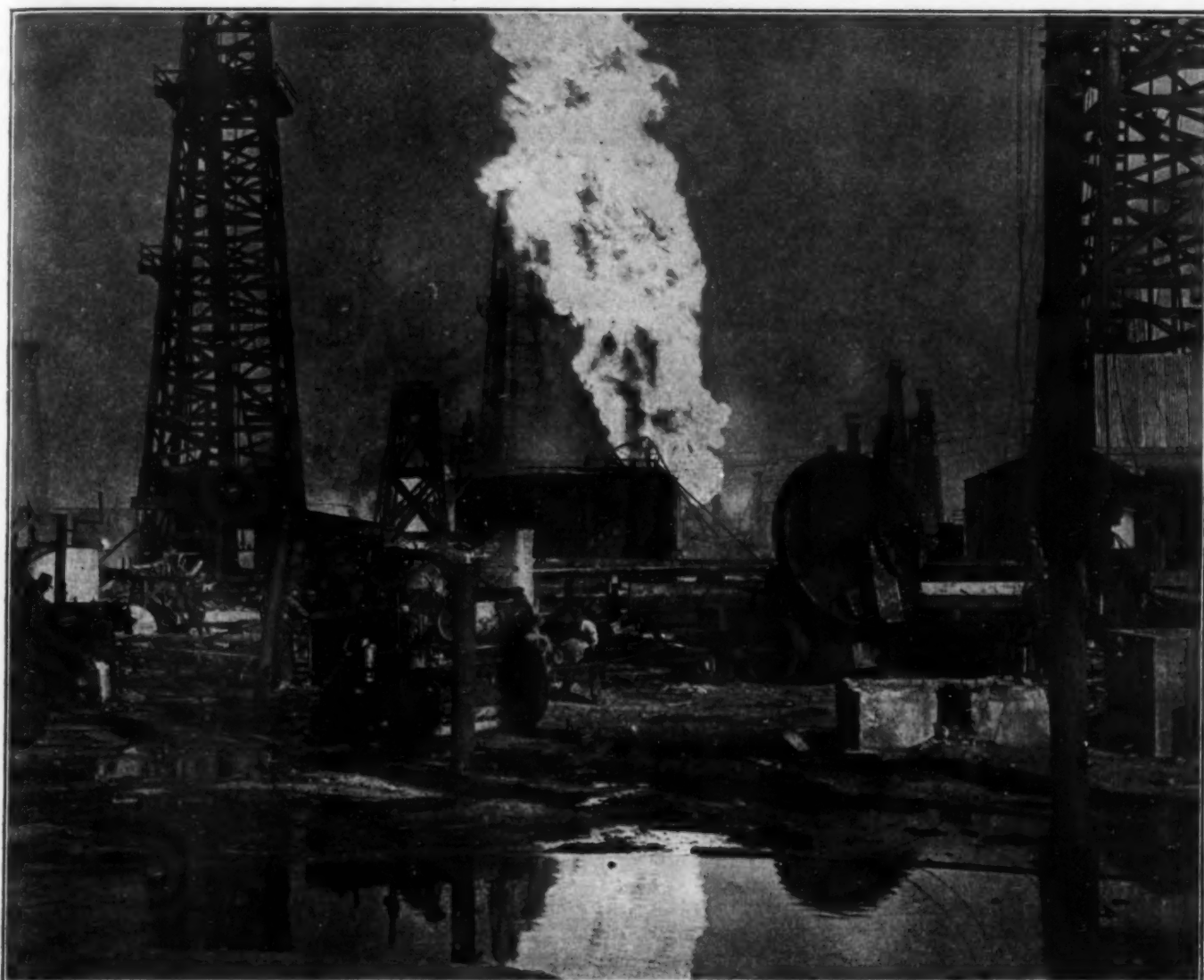
THE speed, versatility, rugged construction, big yardage and low cost of the Funderm combination shovel, ditcher and crane, make it a sensational performer and money saver.

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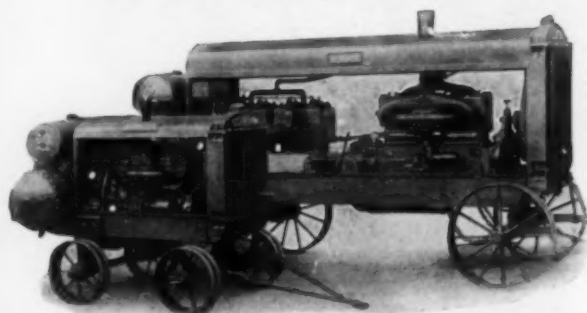
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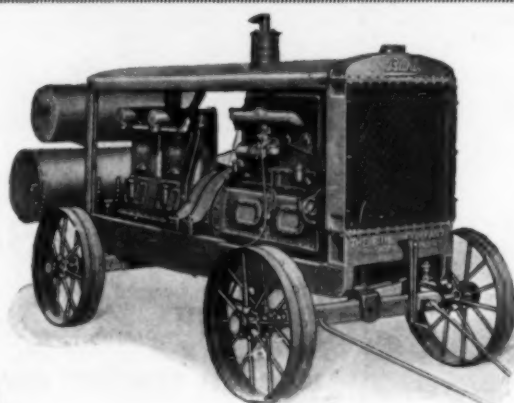
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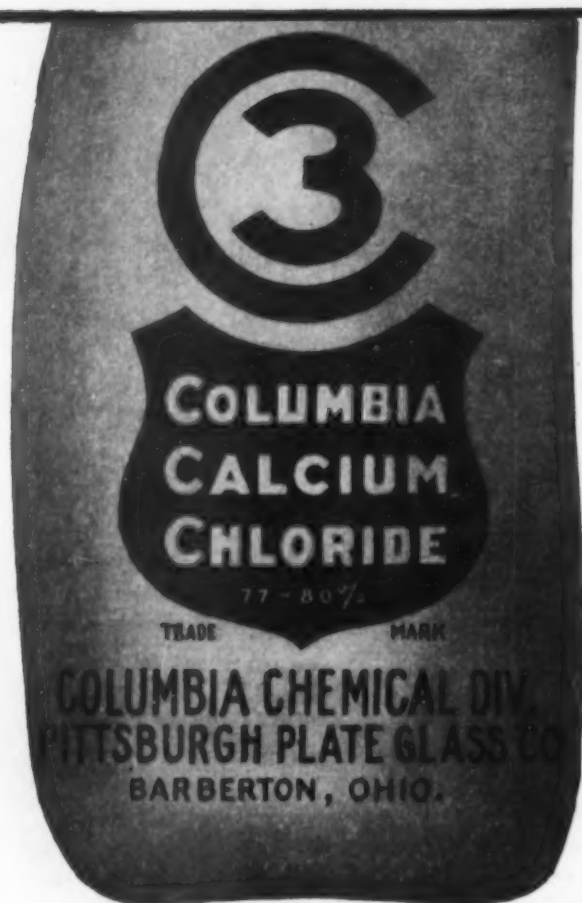


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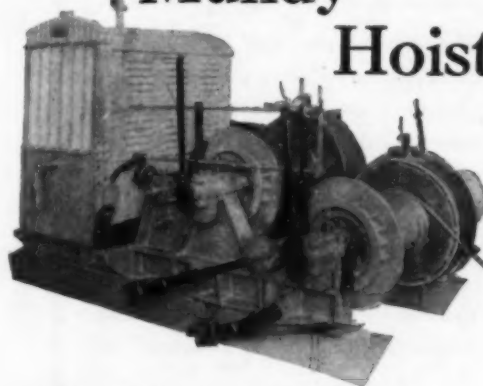


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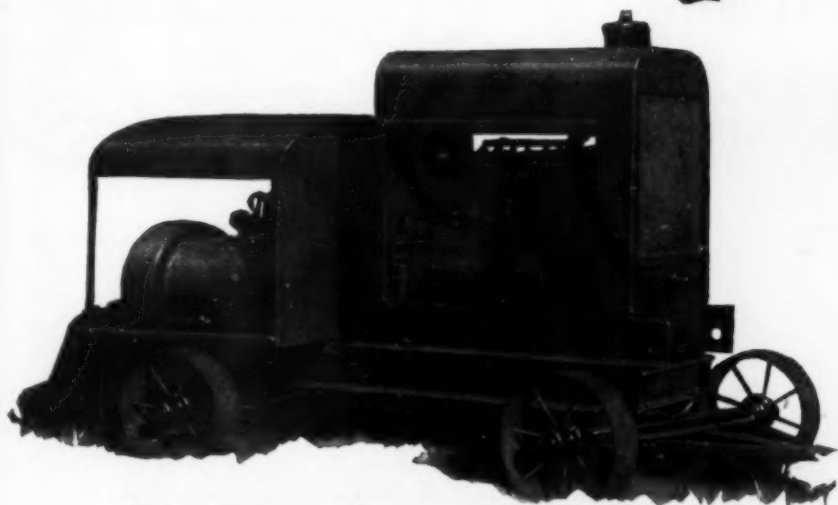
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Flud Oil lubrication floods every moving pump part in a continuous bath of oil. Long life is assured and attention reduced to a new minimum.


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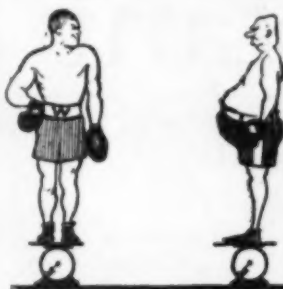
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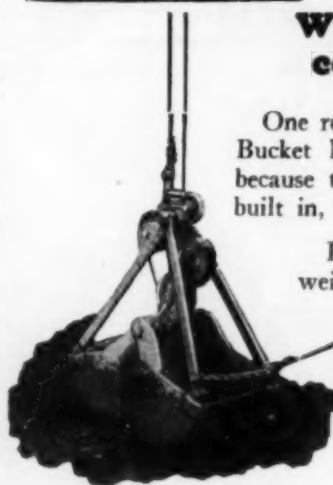
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Both have the weight, but one of them has it in the places—

Where weight counts most!

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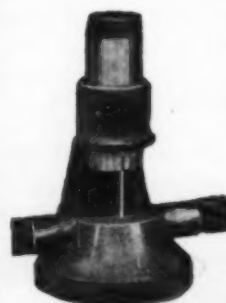
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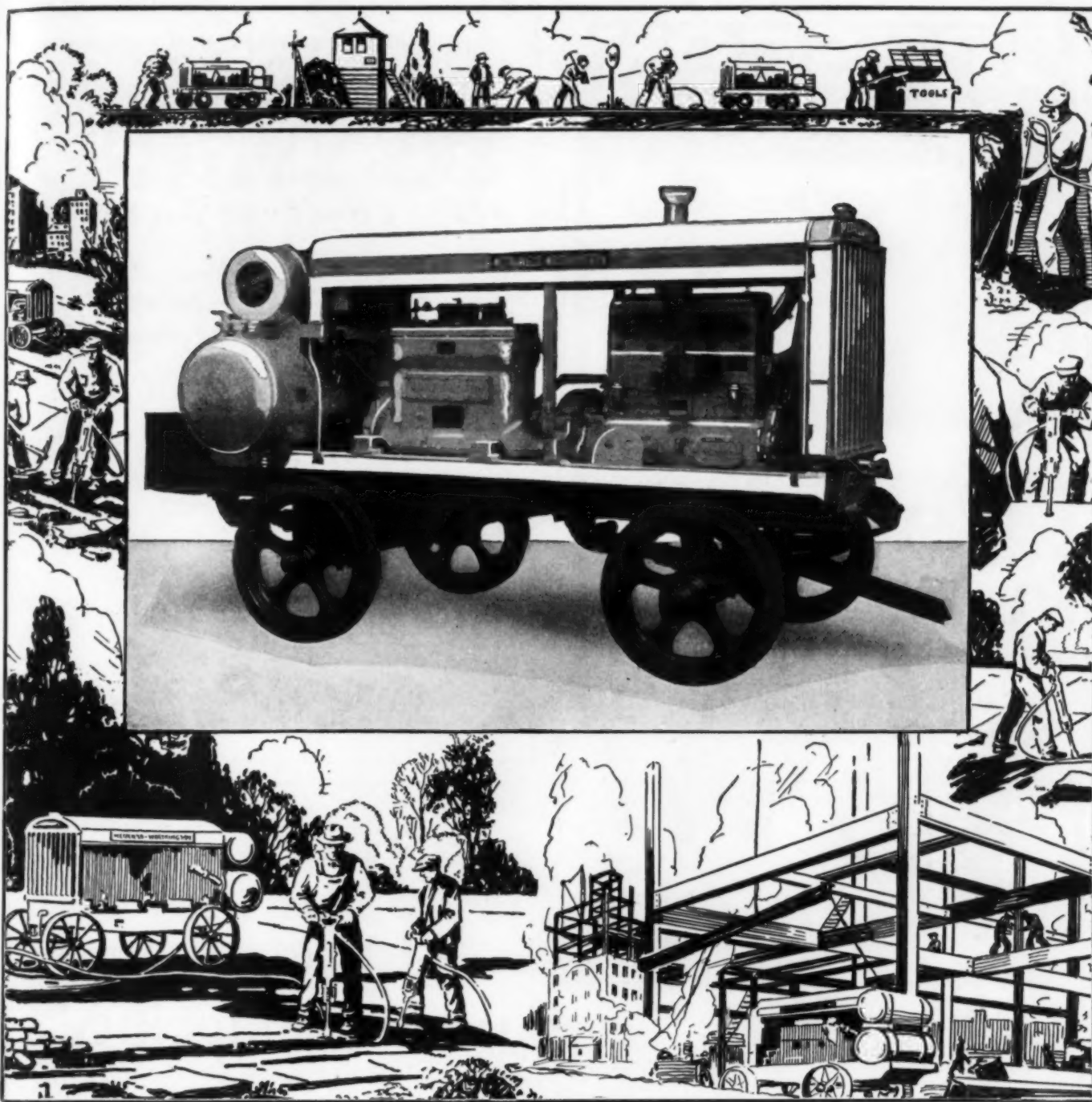
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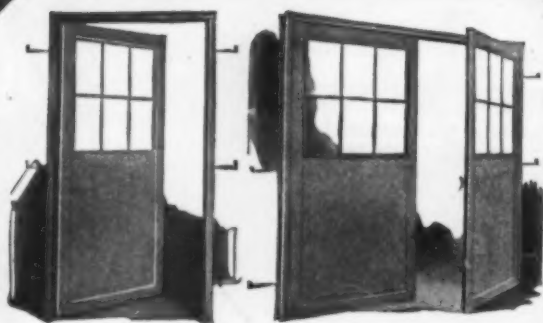
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In their entirety these publications now cover the five major branches of engineering—civil, electrical, mechanical, mining and chemical—and the industries allied with them. They embrace also two divisions of the field of transportation, the electrical and radio trades, the food and textile industries. In addition they serve the interests of production management and service-to-production in all manufacturing industries. And, finally, they enter the broad field of commerce, business and finance.

The effect of this continuous evolution of the McGraw-Hill program has been to expand steadily the gathering and dissemination of business news, to insure the recording of all important industrial developments, to provide authoritative interpretation of events, and to strengthen the activities of each publication through internal co-ordination and co-operation. Publishing facilities for the group as a whole have been enhanced beyond those which any single paper or lesser group might enjoy, and these advantages have found expression in better publishing media for the service of American business and industry.

The spirit animating this co-ordination of related publishing activities is a response to the increasingly severe and exacting demands upon business publishers. It springs from a recognition not only of the desire but also of the necessity for broadening and strengthening the service of the publications to their respective

fields. It is in harmony with the spirit of progress and growth so characteristic of industry and business in this country. It is broader than the mere desire to be in step with business tendencies. The business press, if it is not to lag in the leadership it has attained in the past two decades, cannot rest on its record of performance. It must keep a step in advance, must have the forward look.

Advantages of Co-ordination

DOES IT REQUIRE publishing experience to see the value of co-ordinating publishing facilities? The co-ordinated organization can throw a drag-net over the industrial, engineering and business world; it has the personnel and the facilities for covering all new events, ideas and developments. Today, on the McGraw-Hill publications there are 128 editors specializing in interpretative, creative, technical, commercial and research writing or investigation. Each paper has its own independent staff and is served, in turn, by an effective news-collecting agency, which has the needs of every staff in mind and which knows the interests of the readers of each publication. At the same time each individual publishing staff naturally stimulates and supplements the others through exchange of information from different fields of business and industry.

Thus the collection of data on new developments is broader and its interpretation more authoritative. The leadership of the papers along the avenues of sound progress is surer and more aggressive.

This has been our experience with the entry of every new paper into our group. Just now we expect a particularly great stimulus within the organization from our association with *The Magazine of Business*. For all the other McGraw-Hill publications *The Magazine of Business* now forms a capstone.

It is in truth a magazine of American business, for it serves the policy-forming executives in all branches—in trade, industry and finance, and in all

of the servicing branches, such as transportation, communication, power, insurance and warehousing. It goes to many men who already read McGraw-Hill and other industrial papers. It in no sense replaces them. It talks to specialists, not as the industrial paper does, in terms of their specialties, but in the broader terms of those factors which affect all business from without. It will, therefore, bring to each McGraw-Hill publishing staff a broader sounding of the whole stream of business. At the same time *The Magazine of Business* will draw upon all of these editors for an intimate understanding of the flow of business, as these 128 trained observers see it from day to day in their visits and correspondence with thousands of business men, engineers and industrialists in specific industries. The help of these editors will be all the more valuable because of their intimate contact with science and engineering which are the bases on which modern industry and business are built.

A Great Responsibility

IT IS IN THESE WAYS that, through improved editorial service, the public benefits from the co-ordination of publishing facilities. There are returns to the public, too, through co-ordinated advertising and circulation activities; through economies in production, in purchasing, in administration. All of these enable more money to be spent on the primary service—that of building a better editorial service for the reader.

We are fully conscious that our magazines are an important and direct avenue to the minds of America's business men, her industrialists, and her engineers. Apart from any wish of publisher or reader, such an avenue is bound to create business and industrial opinion and, therefore, affects American business, and, indirectly, the whole American public. Ours is a responsibility of which we are keenly aware. We propose conscientiously to discharge it in the interests of business and the public.

James H. McGraw

Who's Getting the Big Contracts?

A Monthly Guide to Where the Construction Dollar is Being Spent

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Streets: \$624,871
American Asphalt Co., Allen Bldg., Dallas and others.

Montana
Streets: \$382,877
Stanley Bros., St. Cloud, Minn.

El Paso, Texas
Copper Refinery Plant: \$3,000,000
Ingalls Iron Works Co., 720 Ave. D, Birmingham, Ala.

Waco, Texas
Factory: Est. \$250,000
H. K. Ferguson Co., Hanna Bldg., Cleveland, Ohio

Columbia, Mo.
Exchange: Est. \$300,000
Midwest Constr. Co., 209 South 3d St., Columbus, Ohio.

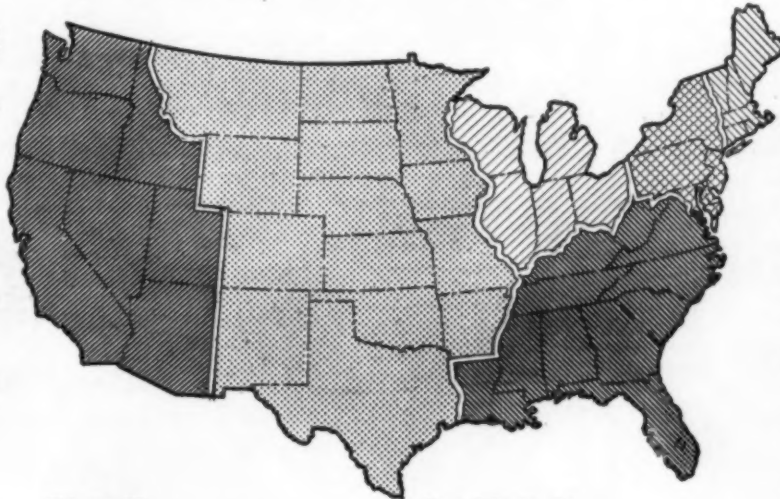
St. Louis, Mo.
Store, Office and Apartment: Est. \$300,000
T. Rubin, 904 Chestnut St., St. Louis and Boaz-Kill Constr. Co., Ambassador Bldg., St. Louis.

Brownwood, Texas
Hotel: Est. \$500,000
A. F. Marshall, Rusk Bldg., San Angelo.

Middle West

Chicago, Ill.
Apartment: Est. \$1,000,000
H. B. Ryan & Co., 510 North Dearborn St., Chicago and others.

Pt. Wayne, Ind.
Office: Est. \$400,000
Hegeman & Harris Co., 431 North Michigan Ave., Chicago, Ill.



Chicago, Ill.
Bank & Office: Est. \$8,000,000
T. Griffiths & Sons Co., 228 North La Salle St., Chicago, Ill.

Oak Park, Ill.
School: Est. \$1,000,000
Frank A. O'Hare Co., 270 Madison Ave., New York.

Detroit, Mich.
Waterworks: \$538,500
W. E. Wood Co., 1805 Ford Bldg., Detroit.

Toledo, Ohio
Glass Factory: Est. \$4,000,000
A. Bentley & Sons, Belmont St., Toledo.

Chicago, Ill.
Factory: Est. \$1,000,000
Scown Building Co., 36 West Randolph St., Chicago

Apartment: Est. \$1,000,000
H. Tanisch & Co., 1813 Winona St., Chicago and others.

Apartment: \$600,000
Friedman Constr. Co., 105 North Clark St., Chicago and others.

Board of Trade and Office: Est. \$10,000,000
Hegeman & Harris Co., 431 North Michigan Ave., Chicago.

Merchandise Mart: Est. \$25,000,000
T. Griffiths & Son Co., 228 North La Salle St., Chicago.

Detroit, Mich.
Factory: Est. \$750,000
Everess Winters Co., 1651 East Grand Blvd., Detroit.

Chicago, Ill.
Office and Apartment: \$3,000,000
Lundorf-Bicknell Co., 100 North La Salle St., Chicago.

South

Ripley, Tenn.
Roads: \$157,216
A. A. Davis and Co., Medical Arts Bldg., Oklahoma City, Okla., and others.

Frankfort, Ky.
Roads: \$234,191
H. S. Tye & Son, Eminence and others.

Memphis, Tenn.
Woodworking Plant: Est. \$2,000,000
Rock City Constr. Co., 150 4th Ave. N., Nashville.

Louisville, Ky.
Waterworks: Est. \$750,000
T. Chambers, 435 South 3d St., Louisville.

Frankfort, Ky.
Streets: \$286,429
Mason Constr. Co., West Point and others.

Bessemer, Ala.
Car Shops: Est. \$3,000,000
United Engineers and Constructors Inc., 112 North Broad St., Philadelphia, Pa.

Gadsden, Ala.
Factory: Est. \$800,000
Adams & Co., 542 Plum St. N. W., Atlanta, Ga.

New Orleans, La.
Hotel: \$1,850,000
R. P. Farnsworth & Co., Maritime Bldg., New Orleans.

Port Tampa, Fla.
Tanks and Boiler House: Est. \$250,000
Asiatic Petroleum Co. Ltd., c/o Shell Union Oil Co., 65 Broadway, New York.

Asheville, N. C.
Bank and Office: \$200,000
Hogson Bros., 485 5th Ave., New York.

Nashville, Tenn.
Milk Plant: Est. \$200,000
Foster, Creighton Co., 4th and 1st Bank Bldg., Nashville

Memphis, Tenn.
Dairy Plant: Est. \$150,000
L. E. Toyner & Co., 163 South 3d St., Memphis.

Middle Atlantic

New York, N. Y.
Sewer: \$872,244
Brox Constr. Co., 375 East Fordham Rd.

Dover, Delaware
Streets: \$460,176
Old Line Constr. Co., Chestertown, Md. and others.

New York, N. Y.
Apartment: \$1,200,000
Springsteen & Goldhammer, 40 East 44th St., N. Y.

Apartment: \$750,000
Baker & Levy, 349 East 149th St., N. Y.

Apartment: Est. \$900,000
Starrett Bros., 101 Park Ave., N. Y.

Hotel: \$1,400,000
E. Roth, 1440 Broadway, N. Y.

Office: \$2,500,000
Tardine, Hill & Murdock, 347 Madison Ave., N. Y.

Bank, Office and Store: Est. \$3,000,000
Bricken Constr. Co., 1385 Broadway, N. Y.

Hotel: Est. \$15,000,000
G. A. Fuller, 949 Broadway, N. Y.

Office: Est. \$2,000,000
Starrett Bros., 101 Park Ave., N. Y.

Wilmington, Del.
Office: Est. \$1,250,000
Wark & Co., 1600 Walnut St., Philadelphia, Pa.

Cincinnati, Ohio
Library: \$800,000
Fisher Devore Constr. Co., Dixie Terminal Bldg., Cincinnati.

Ambridge, Pa.
Pipe Plant: Est. \$10,000,000
Fort Pitt Bridge Co., Oliver Bldg., Pittsburgh.

New York, N. Y.
Hospital: Est. \$6,000,000
Hegeman & Harris Co., Inc., 300 Madison Ave., N. Y.

Hotel: Est. \$3,000,000-\$5,000,000
Harper Organization, 271 Madison Ave., N. Y.

New England

Jamaica Plain, Mass.
Apartment: \$700,000
Yarchin & Gluck, 333 Washington St., Boston.

Cambridge, Mass.
Gymnasium: Est. \$1,225,000
Hegeman-Harris Co., Inc., 100 Milk St., Boston.

Springfield, Mass.
Apartment: \$175,000
H. J. Tessier, 1132 Main St., Springfield, Mass.

Marlboro, Mass.
Church: Est. \$150,000
T. J. Hurley Co., 196 Main St., Marlboro.

Bristol, Conn.
Factory: Est. \$100,000
Torrington Building Co., 182 Church St., Bristol.

Hartford, Conn.
Service Garage: Est. \$100,000
Austin Co., Jefferson Bldg., Philadelphia, Pa.

Jewett City, Conn.
Factory: Est. \$125,000
E. Gilbert, Jewett City.

Boston, Mass.
Apartment: \$150,000
Barrows & Co., 41 Central St., Boston.

Garage: Est. \$150,000
F. J. Van Eiten Co., 250 Stuart St., Boston.

Brookline, Mass.
Apartment: Est. \$200,000
Franklin Bros., 30 Mystic Ave., Medford.

Lynn, Mass.
Apartment: \$150,000
T. Rogosa, 25 Bedford St., Lynn.

Needham, Mass.
Bank: Est. \$150,000
C. O. Dodge Co., Erie and Albany Sts., Cambridge.

Roxbury, Mass.
Apartment: \$150,000
M. Harris, 134 Walnut Ave., Roxbury.

Newport, R. I.
Theatre: Est. \$150,000
Carey Quarry and Constr. Co., 33 North Quarry St., Fall River, Mass.

Hartford, Conn.
Hospital: Est. \$150,000
A. F. Peaslee, 15 Lewis St., Hartford.

SEARCHLIGHT SECTION

EMPLOYMENT-BUSINESS OPPORTUNITIES-EQUIPMENT

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 6 cents a word, minimum \$1.25 an insertion, payable in advance.
Positions Vacant and all other classifications, 10 cents a word, minimum charge \$2.00.
Proposals, 50 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.
Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals.)

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 8 to 11 inches..... 7.00 an inch
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C.M.

POSITION WANTED

STEAM and gas shovel operator, first class mechanic, 15 years' experience in all kinds of contractor's machinery, road, bridge and excavating work. Angelo Franciose, 44 Mulberry St., New York City.

FREE BULLETIN

RENNOLDS EQUIPMENT COMPANY, 7 South Dearborn St., Chicago, Ill.—Bulletin No. 112, just issued, gives a complete list of rebuilt used and almost new construction equipment in stock at Hammond, Indiana, featuring a number of special bargains. Equipment not owned but listed is shown separately. Attractive prices are suggested for immediate sales.

If you don't see the equipment you need advertised on these pages, send a list of your requirements to the Searchlight Department, Construction Methods, Tenth Avenue at 36th Street, New York City. You will be put in prompt touch with reliable sources of supply.

1—11x22 RELIANCE JAW CRUSHER ON WHEELS

Location near Jersey City
 FS-88, Construction Methods
 Tenth Ave. at 36th St., New York City

STEEL SHEET PILING

Bought,
 Sold,
 Rented.

WEMLINGER INC.

Service,
 Technical advice,
 Stocks on hand everywhere.

149 BROADWAY NEW YORK

STEEL SHEET PILING

Saves you money and trouble in Foundation, Cofferdam, and Sewer work.

Bought-Sold-Rented—Always carried in stock

LONG DISTANCE TELEPHONE: CENTRAL 0491

S.W. LINDHEIMER, Inc.

31 South Clarke St.

CHICAGO



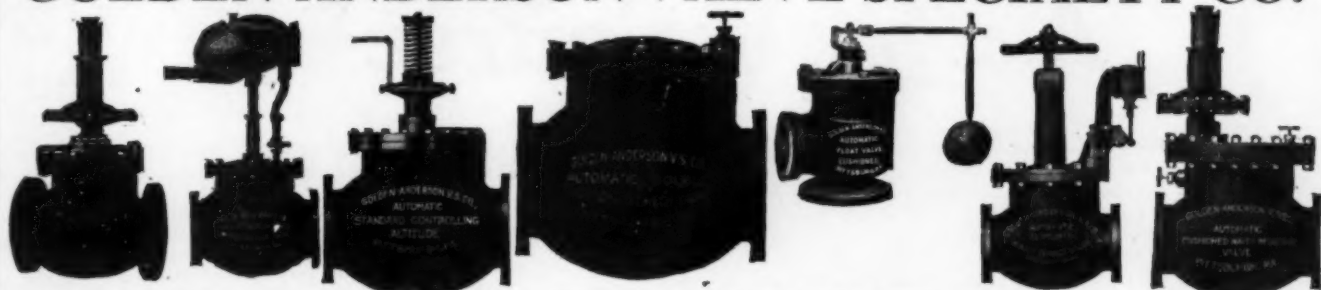
SOME one wants to buy the equipment you are not using. Sell it before depreciation scraps it. Write today to SEARCHLIGHT DEPARTMENT, 10th Ave. at 36th St., New York City.

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GOLDEN-ANDERSON VALVE SPECIALTY CO.



AUTOMATIC CUSHIONED STEAM AND WATER-SERVICE VALVES
 "We Challenge to Test for Merits Any Automatic Steam or Water-Service Valves in the World"
 1330 Fulton Bldg. PITTSBURGH, PA.

Gloves That Wear and Give Comfort

No. 206



No. 206 is a strong, long wearing, comfortable glove. Palm of grey buffed cowhide with outseam, horseshoe thumb. Holdtight back prevents dropping off.

It's a wonderful wearing glove for all kinds of construction work.

Price \$1.50 per pair. Send cash, check, or money order for a pair. Send for complete information on the splendid Sabin Line of Gloves.

Sabin Co.,—Gloves
 536-40 W. Federal St., Youngstown, O.

Sabin Co.,—Gloves

536-40 W. Federal St.,
 Youngstown, Ohio

Send me information on Sabin Gloves.

Name

Address

If you wish a pair of No. 206 Gloves Enclose \$1.50 and check here ☐

A 250 ft. Compressor that actually delivers 210 cu. ft. of air per minute all day long



A Thor of Course~

The most important feature of an air compressor is the "amount of air delivered" per minute. All other features are secondary because air is what you need to run your tools and air is what you must have to cut your costs.

We have designed an air compressor rated at 250 ft. that delivers 210 cu. ft. of air per minute. Compare this performance with any air compressor of 250 or 300 ft. rating on the market and you will realize that a new standard of compressor efficiency has been established.

The reason the Thor delivers more air than any other compressor of the same size is that IT HAS A SUPER-CHARGER. The Rix Super-Charger is an exclusive, patented feature that enables the

piston on its idle or downward stroke to compress the additional air the Thor delivers.

And now for the construction features of the Thor. Look at the photograph above and note its sturdy design—its low slung balance—its easy accessibility—its one piece steel frame which minimizes vibration. And then consider that the Thor is direct driven—it has no clutches, couplings or gears.

Weigh all of these things in your mind and balance them against other compressors and you will realize why the Thor is the best compressor buy on the market.

We have additional proof which you ought to have before you decide. It costs you nothing to get it and it will save you a great deal of money.

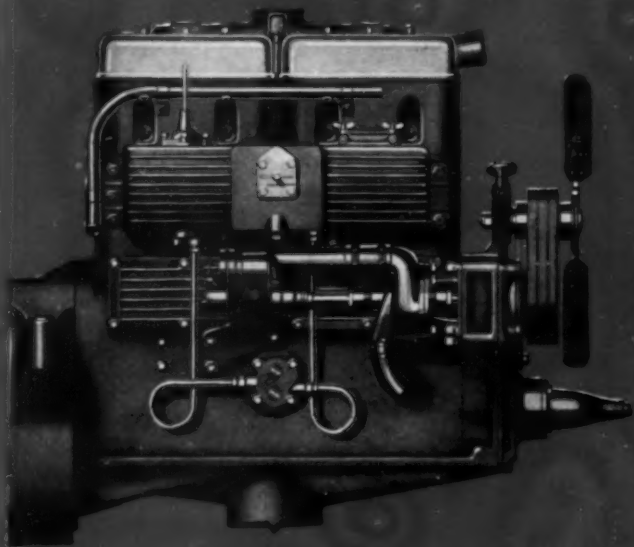
The Thor Paving Breaker is the fastest hammer on the market. Delivers a powerful, hard-hitting blow. Freezing has been eliminated. New steel retainer prevents chisel from dropping out of nozzle. Made in two sizes—No. 241, a speedy breaker for light work and No. 240 a powerful machine for the hardest kind of work.

INDEPENDENT PNEUMATIC TOOL CO.

PNEUMATIC
TOOLS

246 South Jefferson St.
Chicago, Ill.

ELECTRIC
TOOLS



Steady Footage

Two Continental powered Multi-Foote pavers, working side by side, were used by the Commonwealth Improvement Company in paving Logan Boulevard, Chicago. As a result, speedy production was secured and traffic tie-ups on this important thoroughfare were confined to the minimum.

Continental equipped pavers give a surety of performance which counts heavily in day by day operations.

CONTINENTAL MOTORS CORPORATION

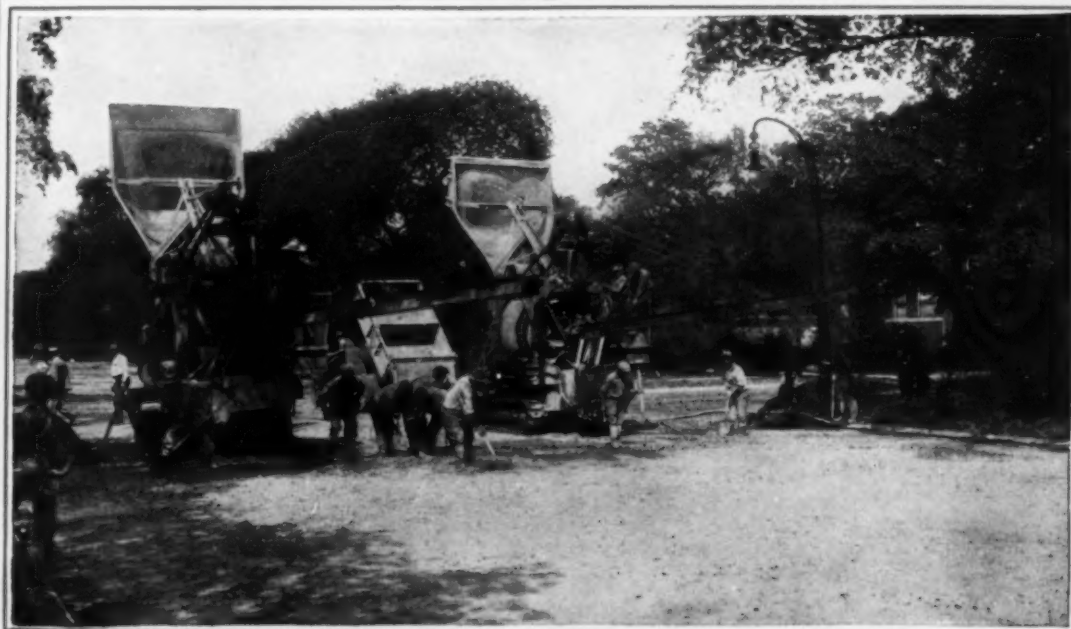
INDUSTRIAL EQUIPMENT DIVISION

Office and Factory: Muskegon, Michigan

The Largest Exclusive Motor Manufacturer in the World



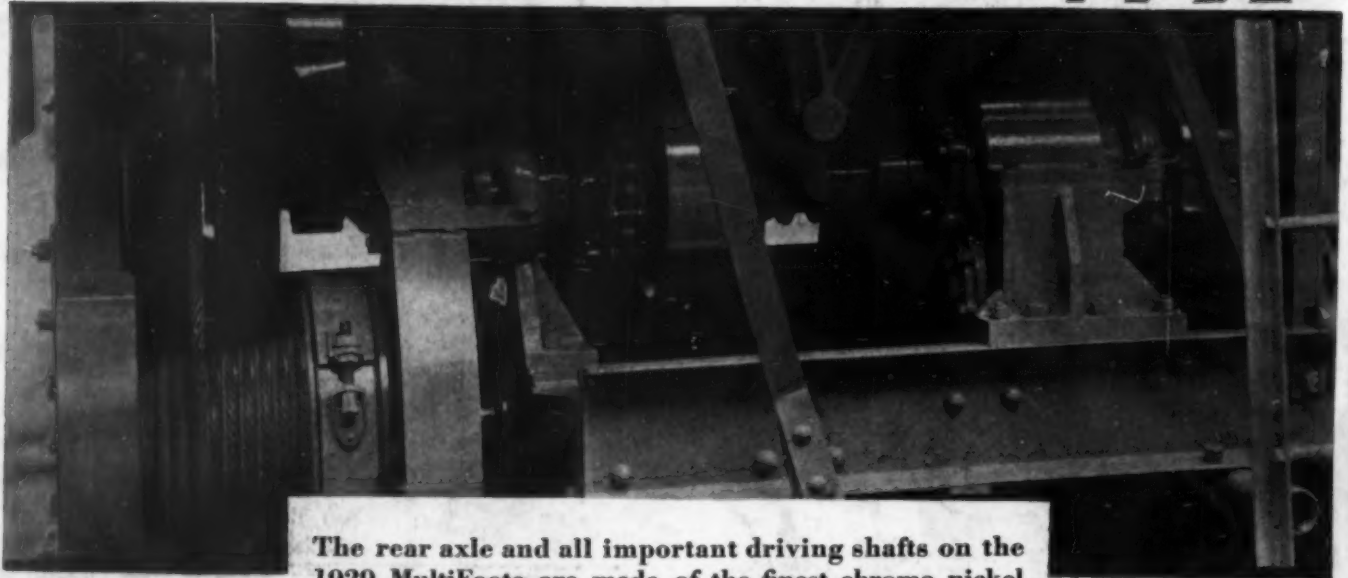
Dependable Power  for Every Purpose



Continental Engines

CHROME NICKEL ALLOY STEEL

FOR THE 1929 MULTIFOOTE



The rear axle and all important driving shafts on the 1929 MultiFoote are made of the finest chrome nickel alloy steel—a metal many times stronger and far more reliable than the material ordinarily used for these important parts. The same metal used for airplane engines and machines where great strength and reliability are the first considerations now has its place in the MultiFoote. That is why these parts without being bigger are many times stronger and many times more reliable.

Just as the MultiFoote pioneered the way with anti-friction bearings, so it is leading the way with alloy steels instead of ordinary metals for the vital parts.

The 1929 MultiFoote with Timken bearings and chrome nickel alloy steel axles and driving shafts sets a brand new standard for speed and reliability.

THE FOOTE COMPANY, Inc.

of Nunda, New York

WORLD'S LARGEST EXCLUSIVE BUILDERS OF ROAD PAVERS

Frank E. Hall
152 W. 42nd Street New York City

E. J. McHarg & Company
31 Crestmont Rd. Binghamton, N. Y.

Wilcox Brothers
508 Chenango St. Binghamton, N. Y.

MultiFoote Sales Company
2811 West Fulton Street Chicago, Ill.

Burton Franklin
Volunteer Bldg. Chattanooga, Tenn.

Edward R. Bacon Company
Folsom at 17th St. San Francisco, Calif.

MULTIFOOTE
The Paver with Timken Bearings

